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## SOME REMARKS ON CHRONIC SUBDURAL HEMATOMA

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THE reason for presenting this subject is to bring out some of the essential points in the operative treatment of chronic subdural hematoma. The drainage of the hemorrhagic cyst through a small opening is effective in a large number of cases. There are times when the partly organized clot is too thick to be relieved by this method. Then it is necessary to do a more radical operation to relieve the compression.

According to the literature this condition was described by Virchow in 1857 under the title of pachymeningitis hemorrhagic interna. In 1925 Putnam and Cushing[1] gave an excellent description under the title of "Chronic Subdural Hematoma." Since then considerable interest has been aroused in this country with discussions by Grant,[2] Rand,[3] Jelsma,[4] Gardner,[5] Fleming and Jones,[6] McKenzie,[7] Keegan,[8] Coleman,[9] and Frazier.[10] Articles covering the symptomatology, pathologic anatomy and etiology have been published by Trotter,[11] Holmes,[12] and Bowen.[13]

The condition is nearly always associated with trauma to head, frequently of a mild nature. In this respect it is similar to extradural hemorrhage, but the "lucid interval" in chronic subdural hematoma is of longer duration. In extradural hemorrhage the blow is received in the temporal region, where a fracture lacerates the middle meningeal artery, resulting in the formation of the extradural clot. In chronic subdural hematoma the blow is frequently rendered to the vertex,

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frontal, or occipital region, causing displacement of the cerebral hemispheres sufficient to tear the cortical veins as they enter the longitudinal sinus.

The hemorrhage on the surface of the brain becomes encysted by the proliferation of endothelial cells and fibroblastic tissue. The formation of the membrane is started in a few days, according to experimental work by Spiller,[14] and the observation of a case by Coleman.[9] The clot is gelatinous at first but soon becomes liquefied, while a portion undergoes organization. It increases in size, due to renewed bleeding or, as suggested by Gardner,[5] the high protein content of the clot attracts fluid through the cyst membrane by osmosis.

The gradually expanding lesion produces symptoms of an increased intracranial pressure over a long period of time. Unless one can get a definite history of trauma the condition will be mistaken for a brain tumor, and its true nature not recognized until a ventriculogram or operation is done.

It frequently covers most of one cerebral hemisphere with its greatest thickness being from 2 to 4 cm. It is bilateral in about one-third of the cases.

The treatment requires some form of surgery to give permanent relief. In 1932, Fleming and Jones[6] and later McKenzie[7] and Frazier[10] adopted a conservative operative plan of evacuating the contents of the cyst through a small trephine opening in one or two places. The plan is based on the belief that the cyst is composed of fluid and small clots which can be removed by irrigation and drainage and that the cyst membrane will disappear without pressure symptoms. This is the operation of choice and it is probably effective in producing a cure in most cases.

Should the patient not be relieved by primary evacuation, irrigation and drainage it will be necessary to make an osteoplastic flap for thorough removal of the cyst and the solid clot.

Two cases are reported illustrating this type of treatment:

CASE 1. A white man, aged 60, was admitted to Sheltering Arms Hospital, Richmond, on March 27, 1934, complaining of severe headache, dizziness and ringing in both ears. His illness had begun on December 1, 1933, with headache in the right frontal and temporal regions, dizziness, staggering gait, ringing in both ears and impairment of vision. He had sudden vertigo attacks during which he fell without loss of consciousness.

His history showed migraine headaches since ten years of age until three

years previously. He had received a laceration of the scalp in the right parietal region five years earlier, which was the only head injury he could recall. After the operation the history was obtained that in September, 1933, seven months before, he had received a slight injury to the right side of the head.

*Neurologic Examination:* Blood pressure was 115 systolic and 80 diastolic. The head showed nothing abnormal and the x-rays of the skull were negative for fracture. The cranial nerves were normal except for bilateral choked discs of 2 diopters, slight lateral nystagmus to the left, and impairment of hearing in both ears. The functions of the lobes of the brain were normal except for ataxia of both upper extremities, more pronounced on the left side. His station and gait were unsteady with staggering in all directions. There were no pathologic reflexes and the tendon jerks were normal.

The laboratory examinations were normal, including a negative blood Wassermann.

*Impression:* Probable brain tumor in cerebellar region, although localization was not certain and a ventriculogram was recommended. At this time the history of head injury seven months previously was not obtained and therefore a chronic subdural clot was not diagnosed.

*Ventriculography:* No fluid was obtained from the right ventricle but the left was easily reached and the fluid replaced by air. Ventriculograms showed shifting of the left lateral and the third ventricle to the left with the right ventricle failing to fill.

Diagnosis was made of a right cerebral tumor.

*Operation:* On the same morning, April 12, 1934, a right osteoplastic flap was turned down under local anesthesia, centering over the parietal and temporal regions. When the dura was opened a large encysted hematoma was found covering the entire cerebral hemisphere from the occipital to the frontal region and from the falx into the floor of the temporal fossa. The cyst was composed of about two ounces of darkly colored fluid with partly organized clots. The membrane showed the typical variegated colors seen in this condition. The solid clots and the cyst wall separated easily from the dura and arachnoid and were removed with little or no bleeding. There was a large defect in the temporal lobe extending to the base filled with the encysted clot. Provision was made for a subtemporal decompression and the wound was closed with silk.

*Progress:* The patient made a good postoperative recovery, except for some mental symptoms which developed soon after the operation, lasting three weeks. These consisted of confusion, disorientation, talking at random and restlessness. He was mentally clear and free of symptoms on his discharge from the hospital.

## DISCUSSION

The diagnosis in this case was not made until the bone flap was turned down and the dura opened. The history and findings were suggestive of a cerebellar tumor but the ventriculogram showed a right cerebral lesion. The only history of head injury that could be obtained from the patient was one

of five years previously, which was considered too old to have any bearing on the present illness. After operation the additional history was obtained of a mild head injury seven months before admission to the hospital. If this history had been known at first a chronic subdural hematoma would have been suspected and effort made to drain the cyst through a small opening. By looking back on the case it is believed that an osteoplastic flap would have been necessary to remove the solid clot and the cystic membrane.

CASE 2. A white man, aged 24, was admitted to St. Luke's Hospital, Jacksonville, on Oct. 29, 1934. He complained of severe headache and dated the onset of the present illness to two and a half months previously. Just before this he had been in swimming but could recall no head injury. The headache was located in the left parietal region and the pain was always worse at this point when he shaked or jarred his head. He had had some nausea and vomiting during the previous month.

By further questioning after operation the history was obtained that he received two blows on the head, one in the occipital and the other in the frontal region on the night of Jan. 3, 1934, when he was held up by a highwayman. He was dazed but not unconscious. Ever since then he had had headache and had not been able to hold a regular job.

*Neurologic Examination:* Blood pressure was 126 systolic and 86 diastolic. The head, including x-rays of skull, was negative. The cranial nerves were normal except that the eye grounds showed blurring of the discs and beginning papilledema of both eyes. The functions of the lobes of the brain checked up normally. No pathologic reflexes were found.

All laboratory examinations were normal, including a negative blood Kahn.

*Impression:* Brain tumor or subdural hematoma was suspected. Ventriculography was recommended as an aid in localization.

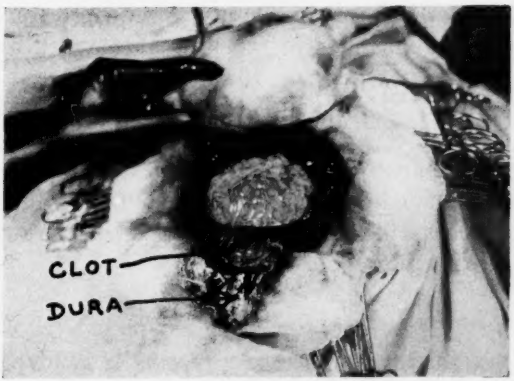
*Operation:* On Oct. 29, 1934, under local anesthesia, a small opening was made in the skull in each occipitoparietal region for ventricular puncture. On opening the dura on the left side two ounces of bright xanthrochromic fluid escaped under pressure. Through the opening the brain was seen to fall away from the dura for 1 cm. On the right side the brain was lying against the dura with no signs of subdural clot. The diagnosis having been established no air injection was done.

He remained free of headaches for two days. Then it returned with increasing severity and evidence of advancing intracranial pressure. It was decided to drain the cyst more anteriorly.

*Operation:* On Nov. 6, 1934, one week after the first operation, under local anesthesia, a small opening was made in the left temporoparietal region 1.5 cm. in diameter and the dura opened in a radiating fashion. Again two ounces of xanthrochromic fluid were removed. After evacuating the cyst two rubber drains were inserted in different directions and brought out through the wound.

*Progress:* There was free drainage at first and the drains were allowed to remain in place 48 hours. During this time the patient was free of headache. In one week the headaches returned with increasing severity and the pressure symptoms and signs progressed. Within three weeks from the time of the first operation there developed bilateral choked discs of two diopters. It was believed an osteoplastic flap operation was necessary to remove a solid clot which was causing the pressure and threatening to destroy vision.

*Operation:* On Nov. 22, 1934, three weeks after the first operation, under local and general anesthesia, a subdural clot on the right side was again ruled out by making an exploratory opening more anteriorly than at first. The patient was then turned to the opposite side and an osteoplastic flap was turned down on the left side centered over the temporal and parietal regions. On opening the dura a large, thick, solid encysted blood clot was found between the dura and brain. No fluid was found in the cyst, as it had been




CASE 2. Photograph at operation showing osteoplastic flap turned down over temporal region and dural flap turned up toward vertex. The solid, partly organized clot 1 cm. in thickness has been cut through around the margin of the wound and turned back. The different colors of the clot do not show, but on the lower surface there is a pattern in reverse of the cortical vessels and sulci of the brain.

drained completely from previous operations. The clot was about 1 cm. in thickness and extended from the occipital to the frontal regions and from the midline to the middle of the temporal lobe. It was firm and fibrous and had the appearance of having been present for a long time. On removal of the clot there was a pattern in reverse on its inferior surface of the brain convolutions and cortical vessels. The clot and cyst membrane were removed completely except for a few tags in the remote recesses and in the region of the cortical vessels entering the longitudinal sinus. Before the wound was closed provision was made for a moderate sized subtemporal decompression.

*Progress:* The patient made a good postoperative recovery. He had occasional slight headaches and there soon appeared some nervousness and irri-

tability. He became very talkative and restless which lasted about three weeks. He was free of symptoms on discharge from the hospital five weeks after the last operation.

After leaving the hospital he had considerable headache, nervousness, insomnia and forgetfulness which he attributed to worry. About this time he developed an acute sinus infection with aggravation of his symptoms. Since this acute infection has subsided the headaches and nervous symptoms have disappeared.

## Discussion

The interesting feature in this case was the interval of ten months from the time of the injury until the patient appeared for treatment. It was also interesting to note that after evacuation and drainage of the cyst on two previous occasions the relief was temporary. With the return of the pressure symptoms an osteoplastic flap operation was required to remove the clot. It was evident that the pressure was caused by the solid clot as no liquid portion was found at this time. The third interesting feature concerned the mental symptoms which developed after the operation. These symptoms may develop before as well as after the operation, but they usually clear up a short time after the pressure is removed. Many of these cases have been admitted to the hospitals for the insane without the condition being recognized.

## Conclusions

Chronic subdural hematoma presents a syndrome closely resembling that of brain tumor. The history of a head injury several weeks or months before the onset of the symptoms should make one suspicious of the condition.

The mental symptoms associated with it are of such a nature as to make the patient forgetful, and a history of the injury may not be recalled until after the clot is removed at operation.

The operative treatment of choice is to drain the cyst through one or two small openings in the skull and dura, at the same time exploring through a small opening to rule out a clot on the opposite side. Should the patient fail to get relief by simple drainage, an osteoplastic flap should be turned down to remove the solid portion of the clot and the cyst membrane.

The mental symptoms of disorientation, forgetfulness, ex-

citability and nervousness are frequently encountered but usually clear up in due time after the operation.

Two cases are reported illustrating the type of hematoma believed to require complete removal of the clot and cyst membrane for relief. In the first case the clot was of such a nature that the patient probably would not have been relieved from simple drainage, while in the second case the simple drainage on two occasions failed to give the patient relief of pressure making the flap operation necessary.

REFERENCES


1. Putnam, T. J., and Cushing, Harvey: Chronic Subdural Hematoma, Arch. Surg. *11:* 329 (Sept.) 1925.
2. Grant, F. C.: Chronic Subdural Hematoma, Ann. Surg. *86:* 485 (Oct.) 1927.
3. Rand, C. W.: Chronic Subdural Hematoma; Report of Seven Cases, Arch. Surg. *14:* 1136 (June) 1927.
4. Jelsma, F.: Chronic Subdural Hematoma; Summary and Analysis of Forty-two Cases Collected from the Literature with Report of Two Additional Cases, Arch. Surg. *21:* 128 (July) 1930.
5. Gardner, W. J.: Traumatic Subdural Hematoma with Particular Reference to Latent Interval, Arch. Neurol. & Psychiat. *27:* 847 (April) 1932.
6. Fleming, H. W.. and Jones, O. W., Jr.: Chronic Subdural Hematoma; Simple Drainage as Method of Treatment; Report of Eight Cases, Surg. Gyn. & Obst. *54:* 81 (Jan.) 1932.
7. McKenzie, K. G.: Surgical and Clinical Study of Nine Cases of Chronic Subdural Hematoma, Canad. M. A. J. *26:* 534 (May) 1932.
8. Keegan, J. J.: Chronic Subdural Hematoma; Etiology and Treatment, Arch. Surg. *27:* 629 (Oct.) 1933.
9. Coleman, C. C.: Personal Communication.
10. Frazier, C. H.: The Surgical Management of Chronic Subdural Hematoma, Ann. Surg. *101:* 678 (Feb.) 1935.
11. Trotter, W.: Chronic Subdural Hemorrhage of Traumatic Origin and Its Relation to Pachymeningitis Hemorrhagica Interna, Brit. J. Surg. *2:* 271, 1914.
12. Holmes, W. H.: Chronic Subdural Hemorrhage; Subdural Hemorrhagic Cyst; Traumatic Pachymeningitis Hemorrhagica Interna; Compression Tardive with Report of Cases, Arch. Neurol. & Psychit. *20:* 162 (July) 1928.
13. Bowen, W. H.: Traumatic Subdural Hemorrhage, Guy's Hosp. Rep. *59:* 21, 1905.
14. Spiller, Quoted by Frazier, C. H. (Footnote 10.)

# HINTS FOR RECOGNIZING THE PATIENT WHO WILL PROBABLY NOT BE HELPED BY AN ABDOMINAL OPERATION

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NO thoughtful man could sit for long in the office of a busy consultant today, listening to the stories of "multi-doctored" patients, without becoming deeply concerned over the number of fruitless abdominal operations which are now being performed. To me, one of the saddest features about these operations is that so many of them could have been avoided if only the physician in charge had asked a few more questions or had made a less cursory examination.

## USELESS OPERATIONS SOMETIMES DUE TO INSUFFICIENT STUDY OF THE PATIENT

A country surgeon, a good operator and a fine man, became so busy that on many days he got more sleep in his car as he was driven around than he got in his bed. Naturally, his decision in regard to operating had to be based usually on a few short questions and a few pokes in the side. One day, while discharging a patient after appendectomy, the nurse called his attention to a metastatic hypernephroma which was projecting from the sternum. He had not noticed it before because the patient had not thought to complain about it. About this time he decided that he must get a junior partner to help him in making diagnoses.

Some may say, "Such carelessness is inexcusable and not to be met with in more educated circles." Years ago I might have agreed to this, but then one day in walked a well known surgeon with a throat still a bit raw after tonsillectomy. This man, sixty years of age, had always been well until a few weeks before, when the lymph nodes on the left side of the neck became swollen. The friend whom he first consulted made a cursory examination and recommended tonsillectomy.

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I need hardly tell you that when this man was really examined we found a large "silent" carcinoma in the fundus of the stomach.

And this sort of thing is still going on. Here is a prominent woman who a few months ago was going to have her gallbladder removed in a large metropolitan hospital. The only reason it wasn't removed was because her brother-in-law, an able physician in the South, knowing that there had been no symptoms of cholecystitis, jumped into an aeroplane and arrived in time to halt the proceedings. When the surgeon insisted that the roentgenologic report of a non-functioning gallbladder ought to be enough indication for operation, my friend turned to his sister and asked: "How long did you hold the dye down?" Her answer was "It all came up in ten minutes!" Repetition of the test showed a perfectly functioning gallbladder, and the patient recovered completely after a much needed rest and the satisfactory ending of a divorce tangle.

## Useless Operations That Are Due to Lack of Experience

Some of the more excusable mistakes are due to ignorance of the rarer diseases. For instance, a man came to The Mayo Clinic with a history of nerve root pain along the lower ribs on the right side, and four useless laparotomies. When the patient undressed, it seemed to me that the diagnosis was obvious because the skin was studded with neurofibromas, and it is well known that in some of these cases severe abdominal pain results from the invasion of spinal nerves by the disease. It is questionable if we should blame the home physician for failing to recognize such a rare disease, but still one wonders if a man who knows how to remove a gallbladder shouldn't know nerve root pain when he meets it, and shouldn't know that appendectomy plus cholecystectomy plus gastro-enterostomy will not cure it.

## Operating Has Perhaps Been Made Too Easy

I wonder sometimes if the modern hospital with its expert crew of assistants in the operating room may not be making the opening of the abdomen too easy and too free from the

dangers of infection and immediate death. I wonder also if those in our profession who are now struggling to restrict the facilities of operating rooms to men who are trained in surgery will ever get much sympathy or support from the public. Is it not curious that the man in the street has never had any sympathy with our efforts to raise standards of practice, but has gone to the polls and torn a hole through almost every fence that we have ever erected for his protection.

## Useless Operations Due to the Insistence of Patients

Our hypothetical observer in the clinician's office would probably be inclined at first to lay the blame for excessive and ill-advised and unfortunate operating on the operators alone, but if he were to look on and listen for a few weeks longer, he would begin to see that much of it must be laid at the door of the patient.

For one reason or another, the patient who has least to gain from an operation is always the one who is most anxious that it be done. By the thousand, these people turn away from able clinicians and wise old family doctors who try to show them why an operation would probably be futile. It doesn't seem to occur to them that when several experienced clinicians agree, they might perhaps be right; instead these people get angry and rebellious, and they go on searching until they find a surgeon who will fall in with their views and will remove the harmless gallbladder or appendix or uterus which they hold responsible for all their troubles.

To show to what an extent this insistence on operations can go, we recently saw at the clinic where I work a young woman with both breasts amputated; she admitted that the surgeon had protested vigorously against being a party to what he felt was a cruel and needless mutilation, but she made him do it in order to free herself from worry over the possible development some day of carcinoma!

A few days later, I saw a girl who seemed to me to have very little reason for desiring the removal of her appendix. I was puzzled until I drew from her the admission that her marriage was going on the rocks and she thought anxiety over an operation might bring back her husband's interest and love!

Another patient admits, after operation is refused her, that she sought it with the hope that she would not recover from the anesthetic. She is despondent over the loss of her husband but hasn't the nerve to end by her own hand the life that is now a burden to her.

Still another patient, a brilliant but erratic man, was so impressed years ago by Sir Arbuthnot Lane's writings that he induced a surgeon to anastomose the cecum with the sigmoid flexure. The results of this operation were so distressing that in the next few years he had to call on seven surgeons in succession to attempt the restoration of normal conditions in the abdomen. Unfortunately they all failed.

Now and then I am able to convince a woman of the functional nature of her trouble, enough so that she is ready to return home and try to win through with rest, but before she leaves Rochester she gets her first taste of the scorn of relatives, the "I told you so's," and the bitter reminders that thousands of dollars have been "wasted on her imaginings," and rather than put up with that for years, she comes back seeking an operation, or anything spectacular, that will first prove that she was ill and that she did suffer, and then give her a chance to get well without being placed in a bad light.

But these are the less common reasons for a patient's getting himself operated on. More often he wants an operation because of fear of cancer or some other serious disease that he is sure has been missed.

Still more often the surgeon's help is welcomed because the patient is so miserable and so anxious to be cured. He cannot believe that distress such as he suffers could ever be due to nerves or fatigue alone; he resents the stigma which he attaches to the diagnosis of a nervous disorder, he wants a royal road to recovery, and he refuses to face the months of effort at self-control, re-education, and rest, which alone can bring him health.

## The Nervous or Psychopathic Patient Suffers Most

I fear that often the physician and the surgeon are misled, as is the patient, by the severity of the suffering. They all conclude that with such pain there must be an organic cause. Curiously the reverse seems often to be true. We all know

that the man with a normal nervous system, especially if he has a little of the stoic in him, will commonly put up for years with the pain and suffering produced by, let us say, an ulcer. He does not want an operation, and even when he has to walk the floor night after night, he may make so little complaint that, finally, it will have to be his wife who gets him to the hospital.

How different it is with the overly fussy psychopathic woman with migraine or "mucous colitis." She may be complaining perhaps of only an occasional headache, with some nausea, a feeling of poisoning, and some soreness in the lower abdomen, and yet she has been operated on three or four times, and has left on the altar of Esculapius, first, teeth and tonsils, and later, appendix, ovary, and gallbladder.

Now, wherein lies the difference between this woman and the man with the ulcer? A lay observer, untouched by that prejudice which is born in us of much annoyance at the hands of many querulous women, would probably say: "Why, the woman with the four laparotomies must have suffered much more than did the man who walked the floor with ulcer. Only suffering could have forced an overly sensitive and fearsome woman to accept an operation, and especially a second one." To us physicians, such reasoning may not go down very well at first, but the more closely we study these people, the more some of us will come to accept the logic of the lay observer and his explanation.

The "neuro" does suffer more than does the man with the ulcer. Why? Just let us take the time to talk to him or her and learn what really is the matter, and often we will find that it is an indescribably horrible feeling of discomfort, of utter discouragement, of great weakness, of unendurable fatigue, of mental fogginess, of something going wrong in the brain, of impending disaster, or perhaps of approaching insanity. These feelings embitter almost every moment of consciousness; they take away all joy and comfort and interest from life, and they produce such suffering and discouragement that the victim is soon ready for anything that will offer a way out.

### Why the Patient Misrepresents the Situation

You, my hearers, may say, "Well, why doesn't the patient

tell us that in the first place? Why does she spend her time magnifying abdominal discomforts and calling them pains? Why does she lie to us?" I can offer several excuses for her; one is that she soon finds that the average physician will not listen patiently to accounts of psychologic troubles or vaguely described sensations: often he is uninterested, incredulous, and without understanding or sympathy; often he scolds; he gives the patient the impression that he believes she is imagining it all; he gives a prescription for a sedative, and he terminates the interview. Soon the victim learns to keep quiet about the psychic distresses, and even to conceal them. Instead she talks about the one thing that she has found will interest the doctor and that is the abdominal discomfort. Unfortunately she ends by overdoing it, and soon she enters the hospital to get the first of a set of linear scars on the abdomen.

## The Physician's Conscience—the Patient—and the Operation

All honor to you physicians who try to talk these patients out of the idea of an operation. You try to show them the truth, but it takes so much time, usually hours; and often you are almost certain that all the patient will do is to shop around until a complaint or a not overly careful operator is found.

Under such circumstances, it is human to say to oneself: "If the operation is going to be done anyway, perhaps it would be better that I do a good job and explore carefully than to let the patient run the risk of falling into the hands of some poorly trained man who will not explore or who may do great injury." This is dangerous reasoning, and personally, I hate to yield to it. He who slips too easily along this path will end by losing his scientific soul.

Often, also, there is that little doubt left in our minds, that fear that perhaps we are mistaken, that the patient is right, and not all of the symptoms are due to the obvious neurosis. Time and again my mistakes have taught me that the nervous or troubled or worn-out person and the psychopath are not immune to organic disease, and no matter how whiney or overly sensitive or worried or scatter-brained a patient may be, and no matter how vague the story told, he or she must be given at least one careful examination before psychotherapy is begun.

The careful and conservative and conscientious physician will sometimes be upset on learning that a person whom he had advised against operation was apparently cured by some other less scrupulous man who, operating immediately according to his usual custom, found a diseased organ and removed it. Or a better diagnostician made a better guess, or the family doctor had a better chance to watch and see the patient during crises of pain or when new symptoms arose, or perhaps the patient got tired of waiting and had himself opened up. All of these things have happened to my patients and I expect them to happen again, because I can never hope to approach perfection in diagnosis. Learning of such mistakes upsets me, but I do not greatly change my way of life. Seeing that mistakes cannot be avoided, what each of us must decide for himself, early in his professional career, is: would he rather have an occasional failure due to his reluctance to ask his patients to bet on perilously long shots, or would he rather make hundreds of mistakes by operating recklessly on almost everyone who comes along.

## "The Operation Will at Least Do No Harm"

Often, the physician who doubts the wisdom of operating is tempted to console himself with the feeling that if he does permit the removal of the appendix, at least he will do no harm. Would that this were always true. It may be true for a person with a normal mind and normal nerves, but it is not true for many psychopathic and overly sensitive persons. In them the harm done by a needless operation is often terrible and irreparable; the abdomen never feels right again; new pains appear; some physician is found who rids himself quickly of a time-consuming patient by making a diagnosis of "adhesions," more operations are performed, and finally we find a husband ruined financially, and a wife lying on a couch, a hopelessly psychopathic invalid.

## The Struggle for Knowledge

I speak of these things with humility because, with the best of intentions and hoping against hope, I have in my time ordered some of these unwise operations which were useless or hurtful. I hope it is true that most of these mistakes were

made years ago when I had not yet learned to appreciate the signs which now warn me to keep the patient away from the operating table. I can look back now and see how, with the optimism of youth and inexperience, I sometimes promised impossible and unlikely things, such as the cure of a migraine by the removal of symptomless gallstones or the making over of a psychopathic weakling by suspension of the uterus.

The greatest handicap of the young physician or the physician with a small experience is his lack of that exact knowledge of clinical pictures, with all their variants, which would enable him to say in a given case: *"Even if this woman has a chronically diseased gallbladder, it could not possibly be producing the group of symptoms that she complains of;* these are the symptoms of a neurosis in a worn-out or psychopathic, or constitutionally inadequate person."

I realize that much of what I can say here will be "old stuff" to some of you who are older or more experienced than I, and I hope that you will be patient with me while I try to pass on to some of our younger brethren some of the knowledge that you and I have acquired painfully and slowly during our years of practice. We who are older would like to help these younger brethren to avoid some of the pitfalls which we now see so clearly. I wish I could warn against all the pitfalls, but some of them are still well concealed and hard to avoid, and I can still fall into these myself.

## The Dangers of the "Emergency Operation"

Patients sometimes tell me that their fruitless operation was done as an emergency. They saw the physician in the afternoon, they were rushed to the hospital, and the appendix was removed that evening. Curiously, in many such cases, I cannot elicit any story of severe pain at that time or of fever or of anything that one would think should have so alarmed the surgeon.

Now, it is obvious that any man who operates often in this way is bound to make mistakes. Occasionally the later course of events will show that the disease was not in the abdomen. It may have been in the brain, or the lung, or the spine, or the right kidney. I am sorry to say that a considerable percentage of the patients whom I see with a stone in the right kidney or

ureter or with duodenal ulcer, have a recently healed McBurney's incision.

The physician who expects to make the diagnosis when the abdomen is open is commonly disappointed, and even when he does make it in the operating room, sometimes he wishes he had studied the patient a little more so that he would have known enough to make the incision in the back or on the left side of the abdomen.

## The Need for More "Explorations" and Fewer "Appendectomies"

The consultant often finds himself wishing that there were fewer "appendectomies" and more "exploratory laparotomies." How he hates the sight of the two-finger appendectomy scar of which some surgeons are so proud. He knows too well the diagnostic errors that it conceals. In thousands of cases, as the operator picked up his knife he should have admitted honestly to himself that really, after the cursory examination he had made, he hadn't any more reason to place the blame for the symptoms on the appendix than on any other tissue in the abdomen. Actually, he should be searching for the origin of the disease and not operating solely to remove one organ, which happens to have a bad reputation and is the easiest to remove. And if he did not care to explore before he lifted up a normal-looking appendix, surely he should have wanted to do so afterward.

Where I work, both clinicians and surgeons have to be mighty sure of the diagnosis of recurrent appendicitis before they content themselves with a McBurney incision and no exploration. If there is any doubt in our minds, and there usually is when we diagnose chronic appendicitis, the surgeon makes a right rectus incision and explores the abdomen. Then, if the appendectomy does not cure the patient, at least we are able to tell him that his disease is not in the abdomen, and if this saves him from further operations, we have done him a considerable service.

At times, of course, as in the presence of what, for convenience, we speak of as an "acute abdomen," operation must be performed in a hurry, but the clinician must always look with suspicion on the surgeon or general practitioner who has

a reputation for rushing his patients to the hospital on the same afternoon in which they are seen. I know a surgeon in a small city who performs many "emergency cholecystectomies" in a year. His material must be unusual because I so seldom see such cases. Even in the presence of empyema of the gallbladder, one can generally take some time for study of the patient.

The overly hurried surgeon may fail also to note in an occasional case that what appears at first sight to be gallstone colic is really pain due to the caving in of vertebrae weakened by hyperparathyroidism or multiple myelomas or carcinomatous metastases. Or he may not think to ask if the patient with what looks like subacute appendicitis ever spent a week at a now medically famous Chicago hotel.

## The Hope of Saving the Patient Expense

I know that there has been many a time, especially in the last six years of depression, when a good, kindly surgeon has operated on a patient without first ordering a careful laboratory and roentgenologic examination because he thought in this way he could save a poor man or woman unnecessary expense. Often in the country and on the frontier this must be done, and in many cases it can be done fairly safely, as when the diagnosis is apparently clear. But when the cause of the symptoms is far from clear, it should be remembered that an appendectomy, together with the hospital expense, costs much more than does the urinalysis which might show red blood cells in the urine, or the roentgenogram which might and sometimes does show a stone in the right ureter.

## The Exploratory Laparotomy

It is not pleasant to have to say to a patient, "We would like to open your abdomen to find out what your trouble is," but there are many cases in which this has to be done, and if every suitable diagnostic measure has first been used, the patient should not complain. Actually, in some cases, as when an older person is stricken suddenly with a severe or painful abdominal complaint associated with wasting, the patient might have reason later to complain of neglect if exploration were not urged early in the course of the disease.

One point on which those of us here assembled will all agree is that an exploratory laparotomy should never be used as a short-cut to diagnosis; to save effort on the part of the physician who thinks he is too busy to take a good history and to interpret it in the light of laboratory reports. Obviously, an exploration is justifiable only when the history and the examination make it seem most probable that the disease is in the abdomen, and that it is something which might be helped by surgical intervention.

The sad feature about so many exploratory laparotomies is that an experienced clinician, if consulted, could have predicted that nothing would be learned and could thus have saved the patient much suffering and expense.

### The Large, Silent Gallstone

Here are a few "don'ts" which may be helpful. If you can help it, don't operate on the strength of a roentgen-ray or laboratory diagnosis alone, without the history that should go with that diagnosis. Thus it seldom helps to remove a large stone with a normally functioning gallbladder, when, for twenty years, the patient hasn't had a colic or much indigestion; and this is the more true when the symptoms are those of a slight stroke or a nervous breakdown, or grief over a loved one who has just died. The problem is different when there are many small stones, some of which might some day work into the common duct and cause obstructive jaundice. Then cholecystectomy may be insurance against later trouble.

### "Duodenal Ulcer" Without Symptoms

Why should one ever operate on a patient whose roentgenograms show a "duodenal ulcer" but who hasn't any hunger pain or much indigestion? What reason would he have for feeling grateful for a gastro-enterostomy, no matter how "successful?" There are doubtless a number of you here today who have suffered with ulcer pain for years, but you are not going to let anyone operate on you so long as you can control your symptoms with rest, diet, and medical treatment, and so long as you can work efficiently. Obviously, you will do unto your patients only what you do unto yourselves in the same situation.

Today, also, the wise surgeon defers operating for ulcer as long as possible whenever he recognizes a type of man who is so tense and nervous, or who is living so strenuous and poorly ordered a life that he would probably suffer with severe indigestion even if the ulcer were to be removed. What is worse, if this type of man submits to gastro-enterostomy he is likely to be one of that small, but oh! so disheartening a group who return with a new ulcer worse that the first.

### Ptosis and Adhesions

Don't expect to make patients over by operating on conditions that are found commonly in healthy persons and which are now looked upon by anatomists as normal variations. I refer to such things as "ptosis" of the stomach or colon, congenital adhesions, such as Lane's kink and Jackson's veil, and retroversion of the uterus (in many cases).

### Psychopathic Persons

If you can possibly recognize them in time, don't operate on psychopathic or somewhat crazy people. They seldom are satisfied with the results of an operation, and they sometimes are made so much worse that they become serious problems. Some are hard to get out of a wheel chair; some jump out of the hospital window; some sue for damages; many refuse to pay any bill; an occasional one shoots his surgeon; and most of them soon constitute themselves a committee of one to ruin the surgeon's reputation in the community.

### Hypersensitive, Fussy Persons

If you can help it, don't operate on persons who are hypersensitive, who cringe or jump as you start to palpate the abdomen, or who scream with pain during the various special examinations which most patients undergo without complaint. There is many a patient whom I have refused to send for operation largely because she made such a scene when an attempt was made to give her a barium enema or to pass the sigmoidoscope or stomach tube. Such people are so sensitive that they are almost certain to complain bitterly for months after the abdomen has been opened. Some of them will never be comfortable again, and all their miseries, formerly scattered about

the body, may become concentrated in the operative field and be ascribed to supposed mistakes on the part of the surgeon.

### People on the Edge of a Nervous Breakdown

If possible, don't operate on people who are worn out with unhappiness or overwork or fussiness, especially when they are close to the edge of a bad, nervous breakdown. The extra strain of operation, and it is a big one, often carries them "over the edge," and some never regain their health. In such cases, if an operation is necessary, it should be put off for a few months, during which time the patient must be given a rest cure.

One of the most helpful ways of detecting this pre-breakdown state is to ask if the patient can concentrate on what he reads. Any intelligent man whose mind is so badly disorganized that he cannot read or get the meaning out of even a short article in a popular magazine is in no shape to stand the ordeal of an operation. The physician should know it also if, because of worry and depression and constitutional inadequacy, the patient with a little indigestion has not worked for years. Another important thing to know is that for months he or she has not slept properly.

### Constitutionally Inadequate Persons

Be wary of operating on the frail, constitutionally inadequate type of person, because his or her troubles are probably functional in origin. Even if organic disease is present, its removal would probably fail to have any decided effect on the general health. I have seen as serious a lesion as a colonic cancer removed from one of these people without making him the least bit stronger or happier. There is no type of operation that will make a Pomeranian into a bulldog.

### The Migrainous Person

Avoid operating on patients with severe migraine, and always be sure to leave the abdomen alone if there is no indigestion between headaches. In that case, the disease is certainly in the head and not in the appendix or gallbladder. Early in his career every gastro-enterologist should become

well acquainted with migraine and all its bizarre abdominal equivalents.

### Crisis-Like Pains Not Related to Eating or Defecation

Avoid operating when careful questioning shows that the pain complained of comes suddenly, like a gastric crisis, without relation to any function of the digestive, the urinary, or the genital tract. I have come to call such pains crisis pains. I cannot often guess what their cause is, but after seeing scores of these patients who have been operated on three and four times without benefit, I now advise against exploration of the abdomen. Perhaps they are suffering with a form of neuralgia, something like that which comes in the face, or these syndromes may be variants of abdominal migraine.

### Mucous Colitis and the Sensitive Bowel

If possible, avoid operations on the woman with mucous colitis. In my experience, one rarely helps her by the removal of appendix or gallbladder or ovary. Watch out for the severer types of food sensitiveness or food allergy. Today many cases of this type of disease are not being recognized, and the patient is operated on without benefit.

### Persons Operated On Several Times Already

Avoid operating on people who have already been to the operating table several times without relief. The chances are that they are not good "material" for operations; the probability is that at the start the cause of their symptoms was not in the abdomen; it may not be there even now, but if it is, the chances are that all the king's horses and all the king's men could not put that peritoneum and intestine back again into a comfortable state.

### Pseudo-Ulcer

In my youth, I would have avoided fruitless operations on a number of patients if I had known how common are three conditions which, for want of better terms, I now call pseudo-ulcer, pseudo-cholecystitis, and pseudo-appendicitis. The expert who has heard a few hundred stories of patients with real

ulcer commonly recognizes the story of pseudo-ulcer. He will be put on his guard perhaps by noting that the hunger distress has been almost constant for ten years or more without getting worse and without bringing on any of the common complications of ulcer. Or if there is some periodicity, it is not typical; that is, there may be distress for a few days and then none for a few days. Usually there is no distress at night, and commonly the relief from the taking of food is not so perfect as it is with true ulcer. When the roentgenologist fails to find the ulcer, the diagnosis of a functional trouble is doubly certain. I have seen a number of these patients operated on and rarely has an ulcer been found.

### Pseudo-Cholecystitis

Pseudo-cholecystitis will be suspected when the history is not typical. Perhaps there has never been a colic, and the gallbladder functions well with the dye. Where I work, we seldom operate on a patient with a normally functioning gallbladder, and then only because the history of colic or cholecystitis is so typical that we feel that organic disease of some kind must be present. Hard experience has taught us to pay little attention to minor defects in filling or emptying or to little hour-glass deformities of the gallbladder.

### Pseudo-Appendicitis

There are a number of conditions that simulate chronic appendicitis, and one of the greatest needs of medicine today is a better understanding of them. In many cases the clinical picture is produced by constipation, with typhlitis, due to decomposition of feces in the cecum; in others it is part of the syndrome of the irritable colon. In many, I suspect it is due to that exceedingly common disease, spondylitis, which is associated usually with some inflammation of nearby nerves and ligaments and muscles.

I feel fairly certain of this because in many cases I find that on picking up and pinching a fold of skin, fat, and muscle on the right side, the patient protests vigorously, and in a number of these cases, the subsequent course of the disease satisfies me that the inflammation is in the spine and not inside the abdomen. This little trick of pinching to reveal the marked hyper-

sensitiveness of the abdominal wall on the right side, if more often used, would save many a patient from a fruitless appendectomy.

So far as I know, the only good indication for an "interval appendectomy" is a history of one or more fairly typical attacks of real pain which began around the navel and extended to the right lower quadrant, and which was associated with a fast pulse, nausea, and perhaps a little fever. If the patient has to stay in bed for a day, if a good physician who saw the attack diagnosed appendicitis, and if thereafter the patient felt below par and somewhat toxic, with gassy indigestion and a tendency to fill up quickly after meals, appendectomy is indicated and will generally bring a good result. So far as I know, there is no roentgenologic sign which can be counted on to reveal the existence of chronic appendicitis. The only one I have found helpful in an occasional case is definite stasis in the terminal coils of ileum.

In the absence of a history of one or more acute attacks, the removal of the appendix for right-sided abdominal pain or soreness is a gamble with the odds heavily against the patient.

## The Diagnosis of a Neurosis Is Often Best Made From the History

It seems to be assumed by many physicians today that the diagnosis of a neurosis is made by exclusion and with the help of much laboratory and roentgen-ray work. Actually, the expert is often sure of his ground simply because the disease has all the earmarks of a neurosis, and almost none of an organic disease. In such a case he will order only enough laboratory investigation to rule out serious disease in blood, heart, lungs, kidneys, and digestive tract.

The physician who can make the diagnosis with certainty when the history is taken has the great advantage that he is not likely to get excited later if he finds a few devitalized teeth, or oversized tonsils, or a little scar in the duodenum, or a hernia. He will know that these things are incidental, and if they need any treatment at all, it had better be deferred until the patient is in better shape to stand it.

When a nervous, fidgety woman complains of pain which has been present all day and every day for fifteen years, par-

ticularly in the left upper quadrant of the abdomen, without getting better or worse, I *know* that I am dealing with a "functional" disturbance, and I know that it will be useless to operate even if I should find a gallstone to remove. Why am I so certain? Because I know, as you do, that the distress due to organic disease usually comes and goes in spells; only "functional" pain is constant.

Here is another woman who comes to have the gallbladder removed, but when she tells me that her trouble is a *burning* which is present *all of the time* and which *moves around* over the *lower* abdomen, I have four good reasons for knowing that the disease is not in the gallbladder, and that even if she has a gallstone, I am not likely to help her by cholecystectomy. I can tell you of two highly sensitive women each of whom began to regurgitate immediately after eating—almost always a neurotic trick—soon after a psychic shock. One was terrified by an earthquake, the other was grief-stricken by the death of her husband. In each case I knew immediately from the story that I had to deal with a neurosis that would have to be treated by psychotherapy. Unfortunately, in each case gallstones were found and had to be removed at the insistence of the patient, and in each case there was no benefit because the gallstones had had nothing to do with the production of the symptoms.

## Adhesions

We clinicians would be eternally grateful to surgeons if they would not yield, as they so commonly do, to the temptation to tell the patient with a poor after-result that the abdomen was found to be full of adhesions; it does so much psychic injury that is hard to cure, and it leads to the performance of so many secondary operations.

I think it was one of your great surgeons in the South who said that "adhesions are the refuge of the diagnostically destitute." Adhesions are sometimes bad enough to produce mild intestinal obstruction, but where they do not do this, I do not know what their symptoms are, and I do not know how to diagnose the disease. I remember that years ago Carman told me that he had given up trying to diagnose adhesions because when he thought they were there the surgeon couldn't find them, and when the surgeon found plenty, his fluoroscopic

study had failed to show any sign of a binding down of any part of the bowel.

## We Want to Do the Wise Thing

We physicians want to do the wise thing and we want to cure the patient, but sometimes our hearts will carry us away when our heads tell us that it is unwise to go ahead; our sympathy and our desire to help will becloud our better judgment; we will hope that the nervous or worn-out patient before us really has something seriously wrong in his abdomen; we will yield to the suggestions of the patient and the family; we will operate, and six months later we will see our mistake. I need hardly tell you that good results that last only a few months do not count.

I hope that the observations here recorded and the suggestions made will be of some service in helping you to increase the percentage of really helpful operations.

## Summary

Many fruitless operations are being performed, some of which would not have been prescribed if a more careful preoperative study had been made, or if certain syndromes had been better known to the physician in charge.

Many fruitless operations are done because the patient wants a royal road to recovery and refuses to face unpleasant facts. Nervous and psychopathic patients suffer more than do patients with organic diseases and hence are more willing to be operated on. Some of the psychologic reactions that lead to the performance of unfruitful operations are described.

The experienced diagnostician is able to say in a given case that even if the patient had a diseased gallbladder, it could not possibly be producing the syndrome complained of. The diagnosis of functional disease should not be made mainly by exclusion but should be made mainly on the basis of a careful history and on the recognition of a well-known syndrome.

Experience indicates that many "emergency" operations should have been deferred until a careful study was made of the patient. A large percentage of interval "appendectomies" should have been "explorations." It is an exploration of the

abdomen that the patient needs whenever the abdomen is opened and the diagnosis is not clear.

It is dangerous and often unjustifiable to operate on the strength of a laboratory diagnosis alone. The symptoms should agree with the laboratory findings; and then, they should be severe or disabling, or the disease should be pregnant with danger for the future.

It is not advisable to operate on persons with conditions of doubtful pathogenicity, such as ptosis, or on persons who are psychopathic, hypersensitive, constitutionally inadequate, highly allergic, or migrainous, or on persons who are on the edge of a nervous breakdown.

It is often unwise even to explore the abdomen of a person with a severe crisis-like type of pain, which, in its comings and goings, is not related to any function of the digestive, urinary or genital tract. It is usually unwise to operate on persons who have already been operated on several times without success.

The author describes three syndromes of pseudo-ulcer, pseudo-cholecystitis, and pseudo-appendicitis which are rarely cured by operation.

Judging by the results obtained, it is rarely advisable to operate for adhesions.

# CHRONIC OBSTRUCTION OF THE DUODENUM DUE TO PRESSURE FROM THE MESENTERY

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THIS paper deals only with chronic obstruction of the duodenum due to pressure from the mesentery. It is not intended to discuss the other causes of duodenal obstruction, such as:

1. Congenital anomalies,
2. Adhesions of gallbladder to other viscera,
3. Healed ulcers with their contracting scars,
4. Pressure from without such as tumors of pancreas, diseased vertebrae, etc.
5. Gastroptosis, the duodenum remaining fixed.

These conditions occur and their treatment consists in dealing with their causes.

What we are concerned with here is obstruction or ileus due to compression, by the mesentery with its blood vessels, of the third portion of the duodenum. That this condition is a definite clinical entity has been shown to be true by numerous writers.

The first paper on duodenal obstruction was written by Boernerus in 1752, according to the Kelloggs. In 1907 Bloodgood wrote about mesenteric ileus, in 1908 Codman reported a case of chronic obstruction of the duodenum due to pressure from the root of the mesentery. In 1910 Stavely did the first duodeno-jejunostomy for this condition. Since then there have been numerous papers on this subject: Higgins in 1926 assembled from the literature fifty cases. Kellogg has written several papers on this subject and states that it is common.

The third portion of the duodenum passes through an acute angle formed by the superior mesenteric artery in front and above and the aorta and spine behind.

This angle was forcibly brought out by Dwight in 1897. He made a series of casts of the duodenum by pouring melted wax into the duodenums of cadavers and allowing it to cool.

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In the majority of these casts, which are still preserved in the Harvard Museum, there is a groove on the anterosuperior surface made by the mesenteric artery and another groove posteriorly, made by the aorta.

Obviously any condition which pulls downward on the mesentery will decrease this angle and thus compress the third portion of the duodenum.

As shown by Conner and Albrecht in a series of experiments on the cadaver, complete occlusion of the duodenum could be produced by traction on the mesentery. They showed that a weight of 500 Gm. (the approximate weight of the small intestine) would cause complete obstruction. Thus a person with a thin, relaxed abdominal wall and a long mesentery, allowing the small intestines to hang down low in the pelvis but not rest on the floor, is the type whose mesentery causes obstruction.

Bloodgood has stated that when the enlarged overfilled cecum with a short mesentery of the ileum causes a straight pull, the mesenteric vessels compress the duodenum. Other conditions which cause this obstruction are ileac stasis, dilated mobile cecum, visceroptosis and relaxed abdominal walls.

The condition is found most frequently in the female Cassius type, the thin hungry-looking, dyspeptic, nervous woman about middle age. By way of illustration I will report one of my cases because it is typical.

### Report of Case

*Present Illness*: A widow, aged 30, consulted me in September, 1933, on account of pains in her abdomen and nervousness. The pains, which had been worse at times than at others, came on in spells with intervals of comparative freedom. They usually came on two or three hours after meals with distention and pain in upper abdomen. The pain would become worse until she vomited, then pain would be relieved. She had lost considerable weight. She had frequent headaches and called these attacks bilious spells. Pain and soreness at times were present all over the abdomen. Menstruation was painful.

*Past History*: This was unimportant, except she had always been nervous. She had one child 9 years old. She had been having "stomach trouble" for several years, in attacks with intervals of freedom. Her condition had been diagnosed at different times and treated as mucous colitis, nervous indigestion and chronic appendicitis; the appendix had been removed three years previously with no improvement.

*Physical Examination*: She was a thin, neurotic type, 5 feet 7 inches tall, weighing 92 pounds. Physical examination was not noteworthy except for the operative scar and tenderness in the upper abdomen just to the left of the mid-line.

After eating a full meal there would be distention and tenderness in the upper right quadrant. She had learned that by pressing upward under the right costal arch and then across the upper abdomen from right to left she could milk out the duodenal contents. She could hear and feel the gurgling as it passed under the mesentery, and this would relieve the pain. Before she learned to do this the pain would frequently remain until she vomited.

*Fluoroscopic Examination*: The lungs were clear. The two sides of the diaphragm functioned equally. The barium entered and filled the stomach normally. The stomach was enlarged and the musculature was of poor quality. The greater curvature was in the pelvis. Peristalsis was sluggish but complete. There was no evidence of organic disease in the stomach or duodenum. The stomach emptied freely when pressure was applied to it. The second and third portions of the duodenum were over-filled, apparently from pressure by the mesenteric vessels.

At six hours there was a two-thirds gastric retention. At twenty-four hours the barium occupied the proximal half of the colon. The cecum was ptosed, movable and tender.

The barium entered and filled the colon normally. The sigmoid colon was spastic and irritable. There were two small diverticula in the transverse colon.

*Diagnosis:* Chronic duodenal stasis and dilation due to pressure from the mesenteric vessels; gastroptosis; spastic and irritable colon.

*Treatment*: She was put to bed with the foot of the bed elevated, forced feedings, enemas, tonics, etc., but after two months and very little improvement, an operation was advised and accepted. This revealed a cystic right ovary, adhesions of the omentum to old abdominal scar, a greatly dilated duodenum and stomach. Apparently the duodenal dilation was caused by compression of the superior mesenteric artery. A duodeno-jejunostomy was done. She made an uneventful recovery and has gained about twenty pounds and improved generally.

## SYMPTOMATOLOGY

Symptoms vary in their severity depending on whether a complete or partial obstruction is present: they may be divided into toxic and mechanical:

*Toxic:* Headaches of the migraine type, mental depression, lassitude, easy tiring, irregular, rapid heart action, cold clammy extremities, secondary anemia and in some cases urticaria.

*Mechanical:* There may be periods of freedom from symptoms, but the patients usually suffer more or less con-

stantly from indigestion and constipation and frequent "bilious attacks." During these attacks they have considerable epigastric pain and distress unless the pyloric sphincter is relaxed. If it is relaxed they vomit large quantities of bile. Pain and tenderness come on two to three hours after meals and are usually present in the epigastric region either to the right or left of the midline just above the umbilicus. When the pyloric sphincter is relaxed and the food and bile are regurgitated they vomit and the pain is relieved. Physical examination usually reveals distention and tympanites behind the right rectus muscle and, as in my patient, with pressure made by pushing the hand upward under the right costal arch and across the abdomen from right to left, the contents of the duodenum can be forced through under the mesentery and pass into the jejunum. The tympanitic note then disappears from behind the right rectus muscle.

The diagnosis can usually be confirmed by x-ray study. The fluoroscope is of more value as, on account of the overlapping stomach shadow, it is often difficult to show the duodenum satisfactorily on a film. Usually with the fluoroscope one can, by lifting the stomach with his hand, see the dilated duodenum easily and by milking from right to left see the duodenal contents forced through the narrowing made by the compression of the mesentery.

## Treatment

As a rule most of these patients have been treated for various types of indigestion, migraine, gallbladder trouble, colitis and a host of such conditions before the true condition is discovered.

Most of the milder partial obstructive types can be successfully treated medicinally by the regimen usually used for visceroptosis such as: (1) abdominal support, (2) sleeping with the foot of the bed elevated, (3) resting after meals in a recumbent position and milking out duodenal contents, (4) abdominal massage, (5) colon irrigations, (6) duodenal irrigation, (7) mineral oil and (8) rest cure, and forced feedings for fat distributes pressure and helps relieve the mesenteric obstruction.

In the cases not helped by medical treatment, surgery offers a great deal. Some can be helped by some type of plas-

tic operation to support the cecum and colon but if there is much dilation of the duodenum, duodeno-jejunostomy offers the best chance of recovery. This is easily done by lifting up the transverse colon, opening the mesocolon, enlarging the hole so that the dilated duodenum is pulled partially through, the jejunum pulled along side and a side-to-side anastomosis made. Gastro-enterostomy does not relieve the condition as I tried it on one of my cases. She has improved considerably but occasionally has vomiting spells.

## CONCLUSIONS

Obstruction of the duodenum by pressure of the root of the mesentery is a definite clinical entity. It is believed to be fairly common if we will look carefully for it. When medical treatment fails a duodeno-jejunostomy is the operation of choice.

### REFERENCES


1. Kellogg, E. L., and Kellogg, W. A.: Chronic Duodenal Obstruction with Duodenojejunostomy as a Method of Treatment; Report of 41 Operations, Ann. Surg. *73:* 578-608 (May) 1921.
2. Kellogg, E. L.: Diagnosis and Treatment of Chronic Duodenal Obstruction, Surg., Gynec. & Obst. *28:* 174, 1919.
3. Bloodgood, J. C.: Acute Dilatation of the Stomach; Gastromesenteric Ileus, Ann. Surg. *46:* 736-762, 1907.
4. Bloodgood, J. C.: Dilatation of Duodenum, South. M. J. *22:* 980 (Nov.) 1929.
5. Codman, E. A.: Chronic Obstruction of the Duodenum by the Root of the Mesentery, Boston M. & S. J. *158:* 503-510, 1903.
6. Stavely, A. L.: Chronic Gastromesenteric Ileus, Surg., Gynec. & Obst. *11:* 288-297, 1910.
7. Higgins, C. C.: Chronic Duodenal Ileus; with Report of Fifty-six Cases, Arch. Surg. *13:* 1-42 (July) 1926.
8. Dwight, Lewis: Notes on the Duodenum and Pylorus, J. Anat. & Physiol. *31:* 516-521, 1896-1897.
9. Kundrat, cited by L. A. Conner: Acute Dilatation of the Stomach, and Its Relation to Mesenteric Obstruction of the Duodenum, Am. J. M. Sc. *133:* 345-373, 1907; Tr. A. Am. Physicians *21:* 579-617, 1906.
10. Holton, C. F., Savannah: Personal Communication.

# COMMON DUCT INJURIES AND RECONSTRUCTION

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SINCE the publication by Sullivan of the method for repair of traumatized bile ducts numerous contributions to the literature have been made, the greater proportion, however, devoting themselves to the early literature and few to the patient and his repair.

To grasp properly the cause of accidental trauma, outside of sheer recklessness or stupidity, one must consider the anatomy of the structures directly concerned in both accidental and unavoidable trauma. In the latter, the unavoidable causes,

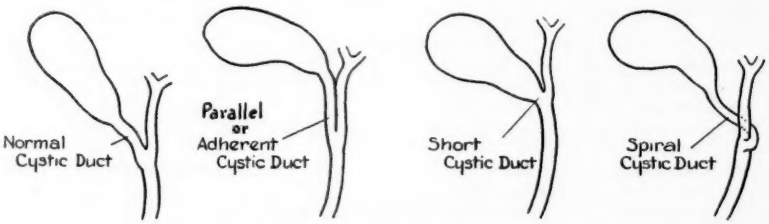


FIG. 1. Variations of origin and course of the cystic duct.

one must consider inflammatory conditions and new growths.

In the anatomy we must bear in mind the course that the cystic duct pursues. There are three major courses by which the cystic duct may approach its union with the hepatic—the spiral, the parallel, and that of the acute angle usually described in the works on anatomy. It requires no great imagination to see how the spirally implanted cystic duct may be grasped with the common or hepatic duct, especially if the spirally curved cystic unites on the opposite side or under the main duct. The parallel duct, lying upon or to the side of the main duct is or may be so closely adherent, due to adhesions or cellular tissues which bind it to the common or hepatic duct, that the operator is deceived and unless great care is taken in its release the common duct will be lifted from its

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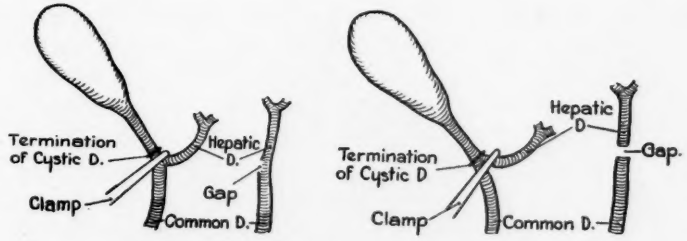


FIG. 2. Common duct injuries by clamp or ligature.

bed and clamped off. While the acute angle type obtains in the majority of instances yet the angle may vary so as to be a distinct source of error.

The various lengths of the cystic duct must also be thoroughly understood. A short cystic duct may lead to a lateral grasp, either by clamp or ligation, of the common duct, thereby producing a compression slough of the walls of the common duct sufficient to prevent spontaneous repair. To obviate the danger of injury to the duct the cystic duct must be thoroughly demonstrated in its continuity from the gallbladder down. This is easily done in the majority of instances by splitting the peritoneum on the right side over the gallbladder about ½ to 1 inch from its hepatic bed. The gallbladder can then be elevated and rotated on its long axis so that the underlying structures can readily be demonstrated. The cellular tissue can then be pushed aside, and the terminal Krause pouch and the beginning cystic duct demonstrated. With the fibroid changes seen in some of the long-standing and recurring infectious varieties, great care must be exercised as this type of new-formed tissue may be found to extend into the common duct. The slightest mishap in dissection in such cases will produce all the damage imaginable.

The arterial supply is sufficiently presented in its vagaries both by our anatomic textbooks and by the more recent articles of Eisendrath and others. Too great care cannot be exercised in approaching the cystic artery, and in the event of hemorrhage by tear, slipping of the clamp and the like, the most thorough care must be sustained in finding the bleeding point. I am quite convinced that in an attempt to stem a sudden hemorrhage, either real or imagined, mass grasping by means of an artery clamp has included the duct. One should never allow

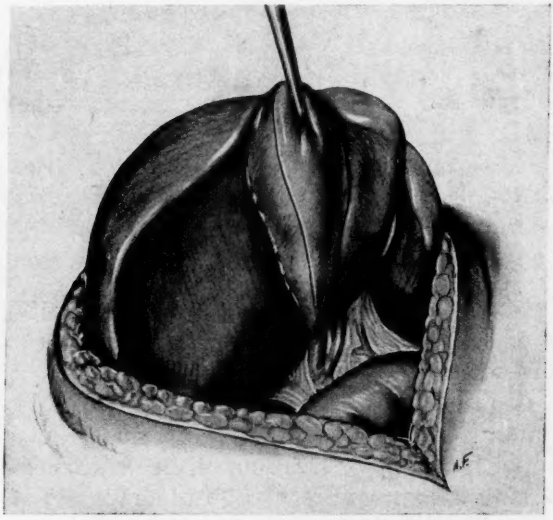

FIG. 3. CHOLECYSTECTOMY. Step in the method of preventing injury to the common and hepatic ducts: incising the peritoneum on the right side of the gallbladder.

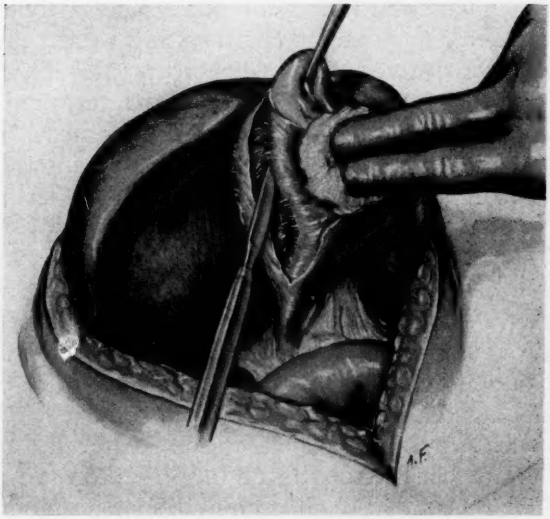

FIG. 4. CHOLECYSTECTOMY. Rotating the gallbladder on its long axis exposes its vascular supply and the cystic duct in the process of dissection.

the assistant to attend to deep hemorrhage. In a medico-legal case the question of destruction of the blood vessel supply arose as follows: "May not the clamping or tying of the vessel produce a thrombosis extending into the minute vessels or the main vessels of supply of the duct, thereby producing a true surgical slough?"

Among the non-neoplastic, pathologic causes, the atrophied or contracted gallbladder has its share in producing trauma,

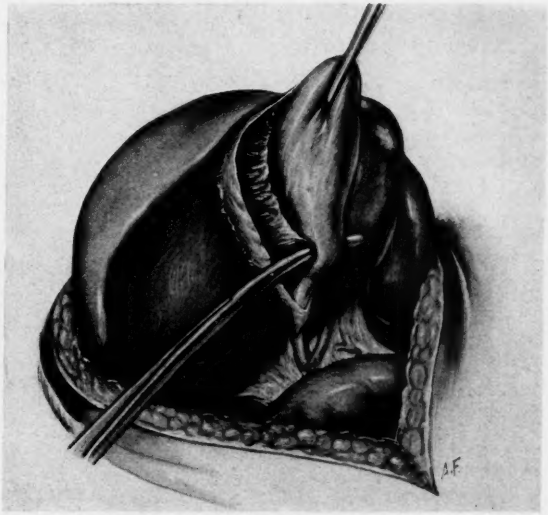

FIG. 5. CHOLECYSTECTOMY. Exposure of the cystic duct and its liberation from peritoneal covering and cellular tissue.

as well as has the thickened and fibroid infiltrated type. Gangrenous extension obtains by the same routes as does gangrenous extension seen occasionally into the cecum from a gangrenous appendix. Ulceration from biliary calculi may be productive of stricture formation or destruction of the duct wall sufficient to produce obliteration of a part of the continuity of the duct. In addition to the trauma caused by anatomic abnormalities, there are those induced by the operator. For instance, the placing of ligatures too close to the common duct or the infolding by the ligatures of a part of it, larger than will normally be repaired, or that may be repaired leaving a distinct stricture or producing a definite contracture, each of which may be followed by occlusion in a short time.

The incision for choledochostomy should be in the long axis of the duct and not transverse. Great care not to tear the duct transversely should be exercised in the use of forceps or the finger when entering the common duct for stones. This applies also to the use of the stitch in securing a drainage tube in the duct when necessary. Such an accident in a very fat woman occurred in my service some years ago. While I was placing the needle in the wall of the duct the patient attempted

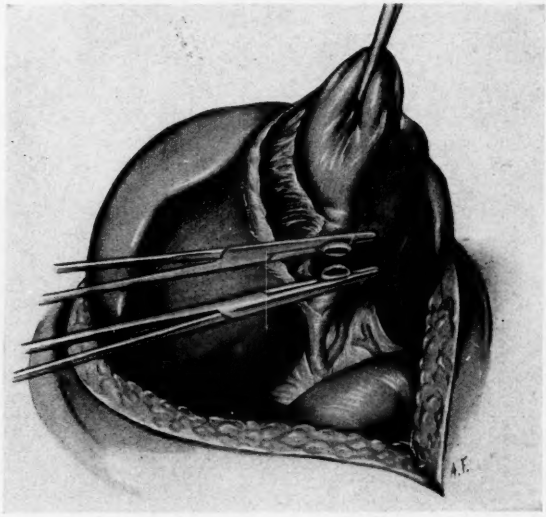

FIG. 6. CHOLECYSTECTOMY. Dividing the *well-exposed* cystic duct between two artery clamps.

to vomit. This resulted in a tear of the common duct fully one-half of its circumference in addition to my longitudinal cut. Several stitches were required. After six or seven weeks of great anxiety on my part the fistula closed.

Grasping the common duct as mentioned before for some anatomic anomaly or from lack of recognition on the part of the operator, may cause injury. I am satisfied from my series of cases with the teachings that after cholecystectomy the remaining stump of the cystic duct, as well as the entire common duct, may dilate. This may have had to do with trauma of the duct, because the operators in their attempts to make a perfect cholecystectomy have gone to the extreme of dissecting the cystic duct to its common duct union, thereby jeopardizing

the integrity of the common and hepatic duct, both in its vascular supply and as a direct ductal wall involvement. In using the gallbladder as a tractor in demonstrating the cystic and common ducts the common duct may be so coned as to include, by clamping or tying, the surrounding area and the union of the cystic to the common. As a result a hole is left in the common duct that is so large as to be productive of a fistula for a long time and then, if closed, produce destruction by cicatricial contraction. Then, too, by placing the clamp or ligature lower, a section of the duct may be cut, thereby leaving, on retraction of the divided ends, a gap of ¼ to 1 inch in the duct's continuity.

When the vessels slip, either through the forceps blades or from the ligature, careful pressure and grasping the edges of the area guardedly with forceps so that the well of blood is readily outlined will often give access to the bleeding point. No suture should be applied deeply for hemorrhage until one is sure that neither the hepatic nor the common duct is in danger of having the ligature either transfix or surround it.

Trauma results in one of two ways, both as a rule easily diagnosed, the one with the fistula less easily than the one without. In the first instance there is a persistent fistula discharging bile in greater or less amount. In the second variety there is no leak from the abdomen or into the abdomen, but in a short time jaundice begins.

The history of the fistula-bearing type must be carefully taken and all possible information regarding the original operation must be obtained. Fistulas, in addition to the duct trauma under consideration, follow cholecystostomy, choledochostomy and cholecystectomy. In the cholecystostomies there is the drainage due to improper fixation of the fundus of the gallbladder, as in the earlier cholecystostomies when the operator attached the gallbladder to the skin; also occasionally, when the gallbladder was attached to the rectus muscle, fascia or peritoneum by means of a non-absorbable material. Again, a fistula may follow where the bladder infection continues for a long time and when all stones have not been removed from the gallbladder or when a stone has been overlooked in the common duct.

Fistulas following cholecystectomies may be due to a partial resection of the gallbladder with or without leaving a

calculus or calculi. Again, a fistula results because the ligature is somehow forced off the stump or because a stone in the common duct prevents prompt healing by producing back pressure. Fistulas also may follow choledochostomy, in addition to the causes mentioned, because a stone or stones overlooked may prevent early repair. Or a cholangeitis requiring drainage may not allow an early repair.

The time of repair has to be considered. Fistulas in any operation upon the gallbladder or ducts may persist from three to twelve weeks and close without late untoward results. I am suspicious of trauma when six or eight weeks have elapsed without repair and become rather sure after the lapse of ten to twelve weeks. Nevertheless, a patient with a fistula discharging a varying quantity and with his support not undermined, should receive the benefit of a watchful waiting policy.

Leakage into the peritoneal cavity, when no drain has been used after cholecystectomy, has occurred in my work six times, due in each instance to a ligature slipping or to imperfect closure of the cystic duct. These patients were not greatly upset and recovered readily, as all cystic duct cases will do if not ligated but drained. One patient whom I saw with an intra-abdominal leak—she had been operated upon by a very able surgeon—had ten pints of bile removed by me on her fifteenth or sixteenth postoperative day and seven or eight days later five pints more.

The symptoms in the fistula-bearing patients will depend on the amount of bile drainage. Several of them have been in a very fine condition at the time seen by me, one having a fistula for nine months, but discharging little; another was prostrated at her tenth week on account of a large leakage.

The blood condition varies from a mild anemia with or without an increase of coagulation time beyond operative procedure. Considerable loss in weight and marked prostration may exist.

In the non-leaking variety, except when the bile empties into the peritoneal cavity, the picture is marked and readily recognized. There is a history of jaundice, and of an operation, with or without jaundice in the preoperative period. The jaundice deepens, with no history of any intermittence or remittence, accompanied by prostration, loss in weight, pruritus

and clay or putty-like stools. The blood picture may present a mild degree of anemia with a slight decrease in both red and white cells; the coagulation time may be far beyond operative security, a recent one being thirteen minutes by the capillary method. I refuse operation in any case when the coagulation time is over seven minutes by the capillary method. The urine, molasses to light amber in color, staining the linen yellow, will exhibit bile, albumin and casts.

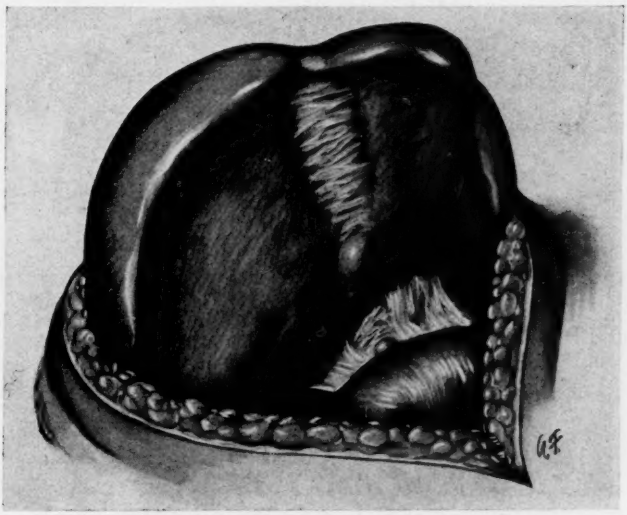

FIG. 7. REPAIR OF THE TRAUMATIZED DUCT. The peculiar tire blowout appearance of the closed hepatic duct seen occasionally. It is a definite landmark for the diagnostic needle. Extending in a broad line above it is scar tissue following cholecystectomy.

In the type of injury in which the hepatic duct does not close colossal leakage into the peritoneal cavity may take place as was observed in the wife of a physician, seen by me a few years ago, who had an injury to the common duct. I saw her on the fifteenth day postoperative at which time the abdomen was distended to the size of a full-term pregnancy—tense, on percussion a flat note, and on palpation a succussion wave. A cholecystectomy had been done fifteen days previous. The temperature was within normal limits, but there was an increase in the pulse rate, dyspnea and some lividity, prostration but no jaundice. The abdomen showed also the low

midline scar of some ovarian operation, the skin edges of which were separated. A catheter had been placed in the wound in contact with the preperitoneal fat but not in the peritoneal cavity. A puncture at this point was followed by the ejection of 10 pints of bile. A tube was introduced for further drainage and on the fourth or fifth day following she was admitted to my service. On examination then it was discovered that there was a dull, fluctuating mass in the upper half of the abdomen, chiefly on the right. An incision was made through the cholecystectomy scar which was followed

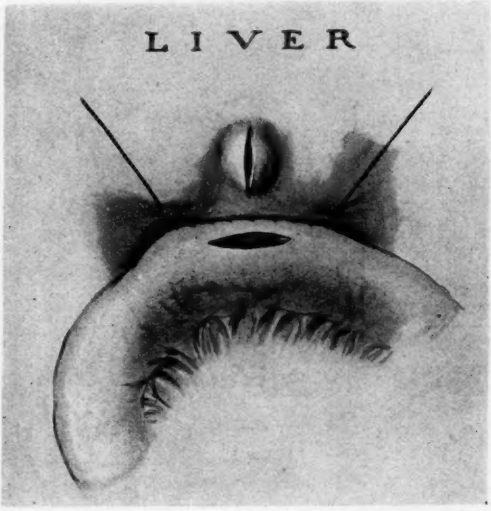


FIG. 8. REPAIR OF THE TRAUMATIZED DUCT. Incision into the hepatic duct. Attachment of the duodenum to the liver and margin of the duct. Incision into the duodenum.

by a discharge of 5 pints of bile with some leakage. A repair some weeks later was followed by prompt recovery.

This excessive amount of bile in the peritoneal cavity with no resulting toxemia has caused me to believe that sterile bile in the peritoneal cavity is not a menace to our patients except by the loss of fluids and salts and the physical disturbances of distention, etc. I have had spilling in six other patients, but not of such a large quantity, with no dire results.

Sullivan, in a personal conversation, said his patient had lived for eight years, dying from a carcinoma of the colon. In

his article he contended and proved that there is a true epithelialization in the duct repair cases and that the process takes place both from above and from below. With the definite results in a clinical case and his experimental proofs in his duct reproduction work on dogs, surgeons find encouragement in attacking this condition.

As a preliminary to operative treatment the dehydrated, undernourished and decalcified patient must receive special attention. The blood should be carefully studied for coagulation time. If this is over normal, three means of improvement

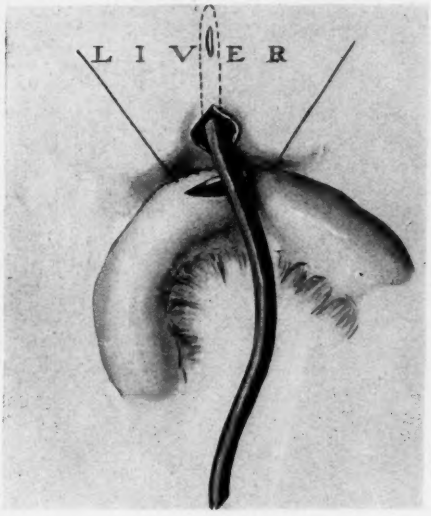


FIG. 9. REPAIR OF THE TRAUMATIZED DUCT. Tube being introduced into the hepatic duct.

present themselves. The first is the introduction of lactate of lime, with such nourishing foods as may be obtained. The coagulation time may be brought within safe limits by the use of chloride or gluconate of lime or by transfusion of normal blood. I am not so much impressed with calcium chloride today as I was formerly. Nevertheless, possibly from 45 to 75 per cent of cases respond to its use. I am very strong for transfusion, much more so than the use of lime. Failing in these two methods, a combination of calcium and transfusion will be necessary.

In these days of expensive donors one feels indebted to the authors for their experiments in the use of chloride of lime. I am using this in 10 per cent solutions—5 to 10 c.c. given daily or every other day for three or four doses, if necessary. The coagulation time is taken each day following the use of the lime. Then if the coagulation time has not come down sufficiently, the patient is transfused with 500 to 1,000 c.c. of blood from his group donor. After the operation he is carefully observed by coagulation tests and, if necessary, we stand

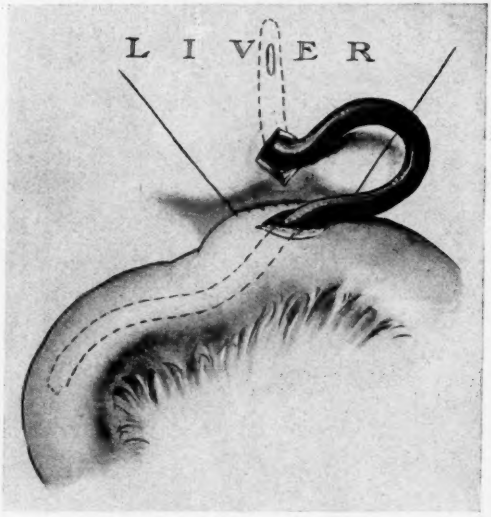


FIG. 10. REPAIR OF THE TRAUMATIZED DUCT. Tube being introduced into the duodenum and made to follow the curve of the gut.

ready to give more blood. Recall that the preoperative condition of these patients is desperate in many instances and in all instances requires surgical help. Nevertheless, these patients when properly prepared stand their operative procedure well. The fistula-bearing patients, provided the flow be not excessive, can and should be observed for a time. They may be fed the various lime salts and artificial biliary salts or ox gall.

The operative repair is a difficult procedure since the normal anatomy is thoroughly distorted on account of the adhesions one has to encounter, the depth of the tissue to be repaired and the great difficulty in finding the proximal hepatic

duct in the non-fistula-bearing patient. Several times I have found it as a small excrescence, above the liver margin, like the beginning of a blowout in an automobile tire tube. The great difficulty lies in finding the distal portion or remains of the common duct. In several of my patients it was found. At present I do not make an extended search for the remains of the duct but proceed after a moderate search to anastomose the duodenum to the hepatic stump.

The methods of repair described in the past are as numerous

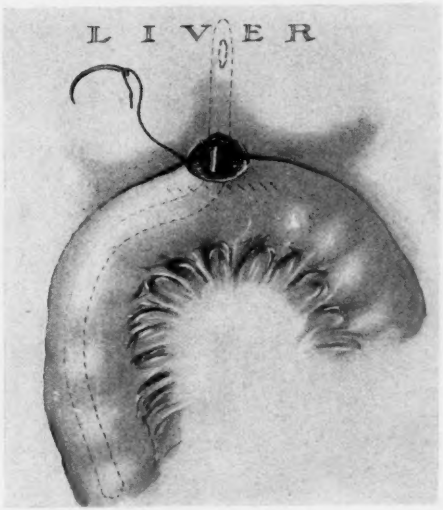


FIG. 11. REPAIR OF THE TRAUMATIZED DUCT. The tube, which has been properly introduced into both the hepatic duct and the gut, has been stitched into the hepatic duct. The lower margin of the hepatic duct and the adjoining margin of the duodenum are being sutured.

as the authors describing them. I do not use any special rubber tube but take the ordinary red rubber catheter of a size that will fit the hepatic duct, say with a caliber of 16 to 20 F. The caliber of the lumen is an important factor, as the diameter of the catheter may be made up chiefly of rubber walls. The tube is placed to remain a long time. Sullivan has reported one in for over three years. My first case, operated upon the second time, kept her first tube in seven weeks and had her second tube in for three and one-half months. Abdominal drainage should be eliminated, if possible. If not possible the drain should be removed in 48 hours. None of

my patients leaked more than a few hours after early removal of the drain. I am inclined to believe that the drains are prone to be harmful to repair and therefore should be removed in from 24 to 48 hours. The incision in these cases may follow the original one. If necessary, when a longitudinal incision had been used in the original operation, a transverse incision may be added thereto, The ordinary Perthes incision will give an excellent exposure.

Careful dissection and hemostasis with clamps and hot pads

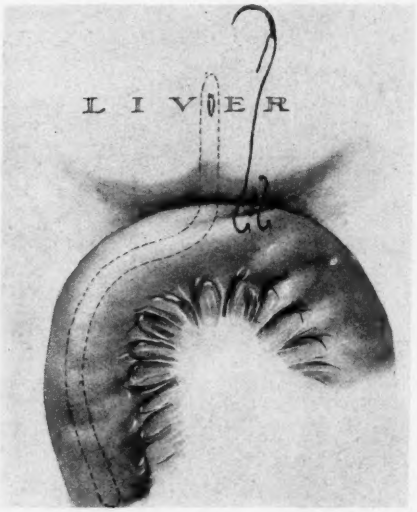


FIG. 12. REPAIR OF THE TRAUMATIZED DUCT. The upper margin of the hepatic opening sutured to the distal margin of the duodenal opening. The final row of sutures has been begun.

are essential. Orientation may be exceedingly difficult because of the bleeding surface, the depth and many adhesions in addition to the fact that the anatomic and surgical landmarks are lost in cases where a cholecystectomy has been done.

Careful search at the lower end of the cystic fissure may expose a small convex surface resembling a tire tube blowout or again the region may be occupied by a dense cicatrix. The use of a diagnostic aspirating syringe is of great value. Withdrawal of bile is followed by incising along the aspirating needle and divulsing the opening. In the event of a fistula, careful cleaning of the depth of the cavities, best done by the vacuum suction tip, will often reveal the opening which can

then be enlarged with probe, forceps, etc. A search must then be made for the distal remains and often one finds only a mass of scar tissue resembling a cord. Several authors advise a trans-duodenal search for the duct by passing a probe through the papilla of Vater when this can be found. It is quite easy to do a trans-duodenal search for the papilla of Vater when backed by an impacted stone but hunting for the papilla in these patients savors of the labor of Sisyphus.

Repair of the duct immediately following its injury is, as a rule, one simply of suture, exercising the ordinary care of

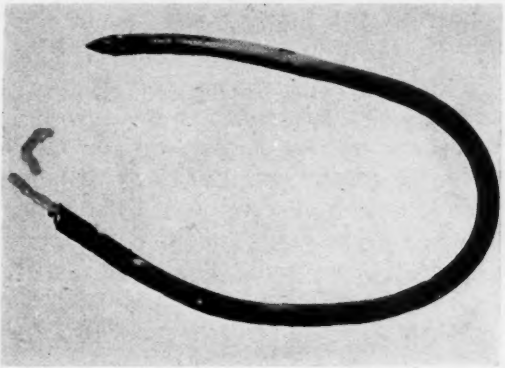

FIG. 13. Photographs of common duct tube removed from a patient. Note the material extruding from the distal end and the crystalline deposit on the proximal (hepatic) end.

edge to edge apposition. It can be done without a rubber tube, provided that in the trauma no great amount, say not over one-half an inch, is destroyed or excised.

Having located the hepatic and common duct when possible, if there has been no great destruction one sews the ends together or, in the cases where a greater amount of the duct has been destroyed, one introduces the catheter or tube and repairs over it by bringing the edges as near together as possible.

My first patient, who after eleven months required a second operation, was one of the latter varieties. I closed over the gap in the duct with the duodenum and some omental flap after sewing the catheter in with chromicized gut. I believe, in view of Sullivan's work, that my tube passed too soon. All my subsequent operations have been done in the following manner:

The proximal end being found, the tube or catheter is introduced 1 to 2 inches into the liver and sewed in with one or two chromicized catgut sutures, grasping the tissues of the duct and the capsule of Glisson in the needle bite. The protruding catheter or tube is cut off so that 6 or 8 inches remain exposed. The duodenum, in the instances when the distal duct is not found, is then attached below the hepatic duct fully ¼ inch to the peritoneum covering the liver (capsule of Glisson) with two to four sutures closely placed. A flap is cut, in character like that in a gastro-enterostomy. An opening is made through the muscular and mucous coats large enough to admit the tube which, by means of its 6 to 8 inches of length, is passed around into the transverse portion of the duodenum, so that the tube has no kink at its entrance into the liver and gut. The musculomucous posterior area is sewed to the edge of the hepatic opening and the anterior to the upper edge of the hepatic opening. Finally, the peritoneum of the duodenum is sewed to the liver above the tube. The well is wiped dry, a rubber tissue drain is placed in and the abdominal wall is sutured. The subsequent care is early removal of the drain, etc.

## CASE RECORDS

The following case records are selected from my repairs:

CASE 1. Mrs. Y., 34 years of age, gave a history of cholecystitis. She had been operated upon in June, 1917, in a neighboring state; cholecystectomy for many stones and appendectomy. On Oct. 25, 1917, the fistula persisting, she was reoperated upon by another surgeon in the same state. Evidently nothing was done on account of excessive oozing. There were two scars in the right upper quadrant of the abdomen, within 2 inches of each other, and bile was discharging. Her usual weight had been 116 pounds; it was 90 pounds when she consulted me in December, 1917. This is the patient who successfully sued her operator.

On Dec. 3, 1917, I repaired the common duct by introducing a rubber tube, through the remains of the common duct into the duodenum and the upper end of the tube into the hepaticus, building a new duct in the gap by surrounding the tube with duodenum and omentum. The tube was discharged at the end of 34 days. By Jan. 17, 1918, the patient had gained 16 pounds. She had normal stools in August. On Nov. 14, 1918, she had some chills and varying attacks of jaundice of eight to ten days' duration. From that time on she began to lose weight and became permanently jaundiced. By Dec. 9, 1918, she was deeply jaundiced and weighed but 79 pounds.

On Dec. 9, 1918, I operated again, joining the duodenum to the hepatic duct flush with the liver, and also attaching the duodenum to the liver. The

second tube was passed practically four months after the operation. This patient was seen by me on Nov. 6, 1923, and was in excellent condition at the time of her last report to me, weighing 139 pounds.

CASE 2. Another case was that of a woman about 28 years of age, who came into my office in March, 1923, profoundly jaundiced, emaciated, in fearful mental and physical state and with numerous scratches and abrasions all over her body. She had had an operation in a suburban hospital eleven months before, followed one month later by pruritis and jaundice.

On June 7, 1923, I performed hepatico-duodenostomy. Her convalescence was rapid with early gain in weight. She returned to the hospital on Oct. 15 for mild jaundice. She was observed for six days and as there was marked improvement she was allowed to return home. On Nov. 10, 1923, she returned again with jaundice more marked, abrasions and scratch marks, loss in weight and some pain over her liver which was greatly enlarged. Roentgenograms showed the tube in its original position. Feeling that the tube had become clogged, I reopened her abdomen on Nov. 23, and found that the tube was well in place. On removal, which was readily accomplished, the hepatic end was found covered with crystals presenting a picture similar to that of a catheter left in the urinary bladder. On compressing the tube in its continuity, I was able to expel a material of fibrous character and consistence and of the color of a cream paste. Upon removal of the tube there was a gush of mixed bile and pus from the liver in such quantity that a rapid diminution in the size of the liver was observed. Although the duct opening felt smooth and soft, I deemed it advisable to place another but shorter tube in. This was done, the patient making a speedy recovery from the operation.

You will observe from these histories that one of my patients required a second operation after eleven months. This was the patient in whom I reconstructed the duct and since the operation described above she has gone 18 years, weighing at the time of her second operation 79 pounds and recently 139 pounds. One of these patients has had slight attacks of jaundice of short duration and reports, after 17 years, that she is in "bully" condition.

One of the patients with the tube in situ, as shown by x-ray pictures, began to develop jaundice a few months later. This was due to a plugging of the tube with mucus or salts, for subsequently the jaundice disappeared.

Following the operation there is a rapid loss of jaundice, a marked rapid mental change and a very pronounced gain in weight. The recurrences must be ascribed to contracture of the newly formed canal following the passing of the tube before proper epithelialization takes place. Therefore, all attempts at fixation of the tube should be made, contrary to the early feeling that some material should be attached to the

distal end of the tube to promote its removal by peristalsis. The great difficulty is that peristalsis will pull and push the tube without any accessory. That the tube may become plugged and obstruct the flow of bile must be considered and this requires removal with or without re-introduction of another.

One of my patients recently operated upon had been operated upon three times previously. At the time I saw her in my office she had a fistula and marked jaundice. The first operation was a cholecystectomy and the following two were evidently not complete operations. I attempted at my first operation the Lahey method but after a supposed establishment of a well lined fistula the sinus closed. Her fifth operation and my second was a success—a hepatico-duodenal anastomosis was done.

Several of the series since 1924 had been operated upon once or twice before I had seen them.

As an aid in finding the duct preliminary to doing a choledochostomy and also as an aid in finding the hepatic duct "blowout" I have been using a diagnostic needle bent at an angle so that the terminal portion runs parallel to the duct. The diagnostic syringe mounted with this type of needle is readily handled with one hand. An added suction tube, slightly bent (20 to 24 F.) with the olive tip is very useful in sucking out detritus from the hepatic or common duct and more useful in doing a choledochostomy than in this type of repair. I have also had the ordinary Blake duct forceps modified so that the grasping end is not fenestrated but is filled in as a spoon; the small stones do not therefore escape through the fenestra but are held by the concave tips. This instrument, as well as the suction tube, will be found extremely useful in doing choledochostomies and in fistula repair operations which are due to impacted stones and detritus.

122 East 70th Street.

## REFERENCE

Sullivan, Arthur: Reconstruction of the Bile Ducts, J. A. M. A. *53:* 774-777, 1909.

# POSTOPERATIVE TREATMENT BASED ON PHYSIOLOGIC PRINCIPLES

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THE postoperative care of a recently laparotomized patient is usually as important as is the operative procedure and in many instances is far more so than the actual operation. Too frequently, however, a surgeon is content with leaving the postoperative care to the house staff rather than supervising it himself and even more frequently the surgeon uses or approves the use of empiric methods which are not based upon physiologic principles.

Every patient whose peritoneum has been opened or even merely exposed, as in retroperitoneal operations, develops a physiologic or "functional" ileus. This diminished intestinal activity, as has been shown experimentally by a number of investigators[1, 2, 3, 4, 5] is the result of irritation of the peritoneum and stimulation of the splanchnic nerves, which exert an inhibitory influence on gut activity. It is therefore essential to realize that in every patient who has had a laparotomy or in whom the peritoneum has been stimulated by an extraperitoneal operation an ileus exists as long as the peritoneal stimulation continues. During the course of the operation peritoneal irritation results from mechanical trauma to the parietal and visceral layers by the incision, manipulation, and retraction, and also from dehydration. The amount of reaction in the peritoneum and the duration of ileus postoperatively are directly proportionate to the peritoneal injury during the operation. The maximal peritoneal irritation and, therefore, the greatest degree of ileus occurs in those cases with continued trauma, as in infections of the peritoneum; i. e., peritonitis. Unless there is a continuation of the peritoneal irritation, the ileus which follows simple opening of the peritoneum is of relatively short duration; i. e., from eight to ten hours. Because this is only temporary and because it

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is associated with no anatomic changes which can be demonstrated, I consider it "a functional ileus."

"Functional ileus" is of little importance if during its existence the gastro-intestinal tract is not overloaded. If, however, this ileus is disregarded and the functionally inactive gastro-intestinal tract filled, undesirable results will be obtained. In "functional ileus" as a result of the stimulation of the splanchnic nerves the normal function is altered as follows: there is decreased tone and diminished movement of the gut musculature associated with decreased absorption from[6] and increased secretion into[7] the gut lumen. Because of the decreased tone and movement, dilatation of the gut is favored because of stagnation of normal secretions, especially in the upper gastro-intestinal tract. The diminished absorption is possibly due to the fact that, because of the decreased tone and diminished movement of the intestinal musculature, there is lost the normal transportation of the upper intestinal contents to the lower portion of the intestinal tract. As is well known, the upper portion of the gastro-intestinal tract is secretory, a large quantity of fluid being poured into the stomach from the gastric glands and even greater quantities of fluid being emptied into the duodenum from the liver, the pancreas, and the duodenal glands. This fluid is normally transported through the small gut into the ileum and colon from which most of it is absorbed, as the lower portion of the intestinal tract is absorptive. If for any reason there is disturbance in this normal transportation of upper intestinal contents to the lower bowel, a diminished absorption occurs. In addition, however, as the result of splanchnic stimulation the otherwise normal absorption may be markedly altered.

The clinical manifestations of the "functional ileus" are familiar to all, but too frequently are accepted as a necessary part of the immediate postoperative period. The principal symptoms are nausea and vomiting, which may persist throughout the functional ileus; i. e., eight to ten hours, unless the ileus is adequately treated from the beginning. The length of time that "functional ileus" exists depends entirely upon the degree of peritoneal irritation. In cases in which the intraperitoneal manipulation and trauma have been minimal, as in a simple appendectomy, the ileus persists a rela-

tively short period of time (from eight to ten hours), unless it is aggravated by improper therapy. On the other hand, in those cases in which the intraperitoneal trauma is greater, as in operation on the stomach, gallbladder, intestines, and uterus, which require packing away of the abdominal viscera and more prolonged manipulation, the period of the physiologic ileus is considerably longer. In contrast to the physiologic ileus is that ileus which is associated with a continuous peritoneal irritation, as is seen in peritonitis, in which the irritation persists as long as the infection of the peritoneum is present. This, of course, cannot be termed a functional one.

### Treatment of Functional Ileus

A great deal can be accomplished as regards the treatment of "functional ileus" by prophylaxis. The careful manipulation and the avoidance of excessive trauma during the operation and the avoidance of dehydration and contamination of the peritoneum tend to minimize the amount of peritoneal trauma. After every operation on the abdomen, however trivial, it is imperative that the surgeon realize that the trauma during the operation causes an ileus for a period of time and unless proper therapy is instituted, prolongation of the ileus will result. As the gastro-intestinal tract is functionally inactive, nothing should be administered by mouth unless the patient has an indwelling duodenal catheter, which will permit immediate evacuation of the fluid.

Morphine should be administered liberally, not primarily because of its analgesic properties, but because, as has been shown by many investigators, morphine exerts a stimulating effect upon the intestine in normal animals, and as we have shown experimentally, it exerts a beneficial tonic effect on the intestines of animals and humans with ileus. Contrary to the opinion of most clinicians morphine does not inhibit intestinal activity, but definitely increases the tone of the intestinal musculature and thus prevents distention. The amount of morphine administered depends upon the age of the patient and particularly upon the degree and extent of peritoneal irritation. Ordinarily, in the adult following a simple appendectomy we use morphine gr. ¼ every four hours and continue it until normal gastro-intestinal activity has been resumed, which is usually after twenty-four to forty-eight hours.

A heat tent is applied to the abdomen in all cases of "functional ileus" because Mueller[7] has shown that the application of heat to the abdomen by increasing the somatic circulation, decreases the splanchnic blood supply which in turn favors intestinal peristalsis and decreases intestinal secretion. Mueller has demonstrated that there is a reciprocal blood supply between the splanchnic and somatic areas and that whenever there is an overdilatation of the vessels of the splanchnic area there is a concomitant contraction of the vessels in the somatic area. In ileus there occurs an overfilling of the vessels of the splanchnic areas together with increased secretion into, diminished absorption from, and dilatation of the gut. If, however, this overfilling of the splanchnic vessels is prevented by a dilatation of the somatic vessels, the undesirable effects on the gut can be obviated. In this way the application of heat to the abdomen by increasing the blood supply in the somatic vessels tends to increase the tone of the gut musculature and inhibit abdominal distention.

In all cases in which there has been more than a minimal amount of peritoneal trauma an indwelling duodenal catheter should be inserted through the nose, and active suction either by the Wangensteen[8] or Bartlett[9] method should be instituted. In our clinic all patients who have had operations on the liver, bile passages, stomach, intestine, and other intraperitoneal extensive operations a Levine duodenal tube is passed immediately postoperatively and active suction started. In this way are removed from the stomach and upper intestinal tract their secretions, which would otherwise remain stagnant because they cannot be transported into the lower portion of the intestinal tract to be absorbed normally. By decompressing the stomach and duodenum and removing the stagnant secretions, nausea, vomiting, and gastric dilatation can be prevented. It is my opinion that no patient following a laparotomy should ever be allowed to become nauseated and certainly should never vomit. Similarly abdominal distention should never be allowed to occur. By adhering to the above described regimen the physiologic ileus will usually subside in from eight to ten hours, and the gastro-intestinal tract will resume its normal activity. After this period of time the patient may be allowed to sip hot water and if no nausea or vomiting occurs, may be given hot tea or fat-free broth. It is impera-

tive not to allow sweetened fruit juices or sweetened drinks of any kind, because of the abdominal distention which occurs as a result of fermentation of an excessive amount of sugar. In my experience[10, 11] the more frequently and the more generously sweetened drinks are given postoperatively the greater is the amount of abdominal distention. The heat tent should be continued over the abdomen in order to favor the increase in the intestinal tone and morphine administered for an additional twenty-four hours.

Generally twenty-four hours after the patient has been able to take hot water, hot tea, or fat-free broth, he can tolerate soft diet and approximately twenty-four hours later a full diet. Enemas or flushes should never be used, because it is quite illogical to assume that the administration of additional fluid by rectum will in any way aid a patient whose gastro-intestinal tract is so inactive that it cannot empty itself of its already contained gas and fluid. It has been our experience that the degree of abdominal distention and discomfort is directly proportional to the number and size of enemas and flushes which have been administered. No patient should receive an enema or flush or catharsis postoperatively. Inspissation of the intestinal contents should be prevented by the administration of mineral oil twice daily as soon as the patient is able to take soft diet. In this way fecal impaction is prevented and when spontaneous defecation occurs the patient experiences no discomfort.

Catheterization should be done every eight hours, for when the patient is unable to void one is never justified in waiting a longer period of time. One need never fear a so-called "catheter cystitis" as long as the bladder is normal and only when the bladder resistance is lowered by stasis and distention with the accompanying vascular changes is infection apt to occur. In the experimental animal it is impossible to infect the bladder even with highly virulent microorganisms unless there is stasis in the bladder. The high incidence of bladder infections following catheterization in cases of urinary retention is undoubtedly due to the diminished resistance of the bladder as a result of overdistention and stasis and not the result of the introduction of microorganisms at the time of catheterization. The stasis and overdistention can and should be prevented by frequent catheterizations. In our clinic in

which catheterization every eight hours, or oftener if necessary, is done in all patients who cannot urinate spontaneously cystitis is an unknown complication.

Following every operation, especially under general anesthesia, dehydration occurs. This is due principally to two factors: (1) the withholding of fluid preoperatively which is necessary in most cases with abdominal section, and (2) the insensible water loss (in perspiration and expired air), which according to Coller and Maddock[12] amounts to as much as 1,000 to 1,500 c.c. in twenty-four hours. Dehydration will become more marked during the first twenty-four hours postoperatively because due to the functional inactivity of the gastro-intestinal tract the patient is unable to take fluid by mouth. The clinical manifestations of dehydration are obvious and consist principally of thirst, dry tongue, and a hot, dry skin. In order to prevent and combat dehydration fluids must be administered in some manner, by rectum, under the skin, or intravenously. We prefer the intravenous administration of fluids because it is felt that it is less disturbing to the gastro-intestinal tract than is the rectal administration and less painful to the patient than the subcutaneous method. We employ a physiologic salt solution, preferably Ringer's or Hartmann's, or 5 per cent dextrose intravenously. As suggested by Coller[12], enough fluid should be given in order to hydrate the patient sufficiently so that he excretes from 1,000 to 1,500 c.c. of urine in twenty-four hours.

In cases in which the operative manipulation has resulted in considerable peritoneal trauma a persistence of the ileus beyond the eight to ten hour period is apt to occur. This should no longer be considered a "functional" or physiologic ileus, but is a true adynamic one. The principal cause of adynamic ileus, however, is continued peritoneal irritation by infection. The too early administration of foods and the use of sweet or iced drinks during the period of "functional ileus" will not infrequently precipitate a persistent adynamic ileus. Hypertonic dextrose solutions in concentrations of 10 per cent or higher if given intravenously predispose to an inactivity of the gastro-intestinal tract and therefore predispose to a persistent adynamic ileus. In persistent adynamic ileus the same disturbed physiology occurs as in the "functional ileus" except that it is more marked. There is a marked decrease or ab-

sence of tone and intestinal movement. There is diminished absorption from and increased secretion into the intestine. There is a pyloric imbalance in that there is a regurgitation of stagnant intestinal secretion from the duodenum into the pylorus which are lost from the body because of the lack of absorption. Unless these secretions are removed through the duodenal catheter, gastric dilatation occurs. Also unless the excessive amount of stagnant intestinal secretions are removed, dilatation with intramural strangulation of the gut occurs. The importance of the intramural compression of vessels has been emphasized by van Zwalenburg[13], Dragstedt[14], Morton [15] and myself [10, 11]. Because of the increased intra-intestinal pressure and because of the peculiar anatomic arrangement of the upper portion of the intestinal tract the vessels of the duodenum and jejunum are compressed and stretched to such a degree that interference with the blood supply in the antemesenteric border occurs with a loss in selective absorption. This is undoubtedly responsible for the more marked symptoms in the "high" intestinal obstruction as compared with those in "low" intestinal obstruction.

The symptoms in adynamic ileus are only those symptoms present in "functional ileus" exaggerated. They consist of nausea and vomiting because of the retained gastro-intestinal secretions and reverse peristalsis, abdominal distention because of the accumulation of gas and fluid in the small bowel and stomach, gas pains, dehydration, and oliguria. The dehydration results from the lack of absorption by the intestinal tract of the normal secretion into the intestinal tract. This lack of absorption is the result of the lack of transportation of the secretions of the upper gastro-intestinal tract into the lower portion of the gut from which they are normally absorbed. As a result of the stagnation, there is an increased secretion which becomes more marked the greater the distention and stagnation of the contents in the gut.

## Treatment of Adynamic Ileus

The treatment of persistent adynamic ileus is relatively simple if one will only consider the possibility of its existence and will prevent its occurrence by prophylactic treatment. Prophylactically a great deal can be done by the avoidance of excessive operative trauma, extreme gentleness during the op-

erative procedure and especially during the handling of the abdominal viscera, the avoidance of a peritoneal contamination which would result in a persistent infection and a continuous irritation of the peritoneum, and the proper treatment during the period of "functional ileus" as described above.

Once a persistent adynamic ileus has occurred, the treatment is much the same as in "functional" ileus. An indwelling Levine duodenal catheter with a number of openings in the lower end should be introduced through the nose, the tip preferably passing into the upper intestinal tract, and active suction instituted. This is done in order to decompress the stomach and duodenum, to evacuate the contents of the stomach and upper intestinal tract, and to prevent the intramural strangulation which otherwise would occur. The toxemia, as a result of the strangulation, can thus be obviated. By decompressing the intestinal tract and diminishing the dilatation a diminished secretion of the upper intestinal and gastric mucosa results. As long as the gastro-duodenal contents are evacuated through the indwelling duodenal catheter by means of active suction, the patient may drink as much warm water as he desires. Until the gastro-intestinal tract resumes its normal functional activity the excessive amount of fluid in the stomach and duodenum will be removed through the tube. A heat tent is applied to the abdomen because, as mentioned above, it favors the increase in the tone of the gut musculature.

Morphine is administered liberally and in cases of peritonitis in which the peritoneal irritation is excessive, the patient should be kept somnolent. Because of the anoxemia which may result from excessive morphine administration, oxygen should be administered in order to combat it.

Hydration of the patient is accomplished by intravenous infusions, preferably 5 per cent dextrose and Ringer's or Hartmann's solution. The amount of fluid given depends entirely upon the amount of negative pyloric balance and upon the pyrexia. Enough fluid should be given to produce a urinary excretion of from 1,000 to 1,500 c.c. every twenty-four hours. If a hypertonic dextrose solution (10 per cent or greater) is administered, it is desirable to combine it with insulin in order to prevent the inhibiting effect of hypertonic dextrose solution on the gut. In severe cases of adynamic ileus the intravenous administration of a 20 times normal Ringer's or Hartmann's

solution is of value, although in our own clinic we have not found this procedure necessary in the past three years. We have been able to combat the ileus in all cases by simpler methods. Enterostomy is never necessary, because as the ileus affects large portions of the intestinal tract, little can be accomplished by the relief of pressure in a single loop of bowel.

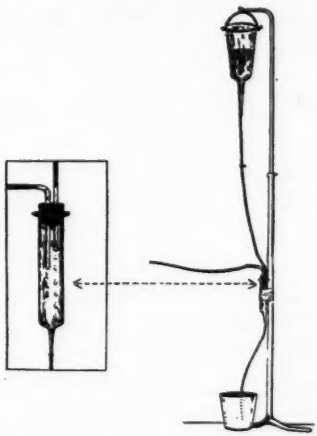

FIG. 1. Diagrammatic illustration showing method of continuous suction, as suggested by Bartlett. Water passing from the vessel above fills the tube extending from the barrel of the syringe down to the floor. The negative pressure exerted on the duodenal tube is equal to the column of fluid in the tube from the syringe to the floor.

Far better is decompression obtained by means of the indwelling duodenal catheter with active suction. The usually employed peristalsis-stimulating drugs are of little or doubtful value. Several years ago we investigated a large number of these drugs and found that of the entire group the only one which was consistently active in increasing peristalsis was eserine or physostigmine. As in the case with the hypertonic salt solution, however, we have found that if the above postoperative treatment is observed eserine or physostigmine is seldom necessary.

## SUMMARY

1. Metalaparotomy treatment should be based on physiologic principles.

2. All patients who have had a laparotomy or whose extraperitoneal spaces have been explored have a "functional" ileus

for a period of time, the length of time depending upon the degree, extent, and duration of the trauma.

3. "Functional" ileus which generally lasts eight to ten hours is best treated by the application of heat to the abdomen, liberal doses of morphine, and nothing by mouth.

4. Hydration of the patient is secured by intravenous administrations of physiologic salt or sugar solutions.

5. Frequent catheterizations will prevent cystitis.

6. Enemas, flushes, and catharsis should not be used postoperatively.

7. Persistent adynamic ileus is best treated by adequately treating the immediate "functional" ileus, by gastroduodenal decompressions by duodenal catheter, liberal morphine administration, application of heat to the abdomen, and intravenous infusions.

REFERENCES

1. Hotz, G.: Beitrage zur Pathologie der Darmbewegungen, Mitt. a. d. Grenzgeb. d. Med. u. Chir. *20:* 257, 1909.
2. Gaskell, W. H.: The Involuntary Nervous System, New York: Longmans Green, 1926.
3. McLeod, J. J. R.: Physiology and Biochemistry in Modern Medicine. St. Louis: C. V. Mosby Co., 1922.
4. Bayliss, W. B., and Starling, E. H.: Preliminary Note on the Innervation of Small Intestine, Proc. Physiol. Soc., London, *24:* 122, 1899.
5. Ochsner, A.: Gage, I. M., and Cutting, R. A.: Comparative Value of Splanchnic and Spinal Analgesia in the Treatment of Experimental Ilius, Arch. Surg. *20:* 802 (May) 1930.
6. Enderlen and Hotz: Ueber die Resorption bei Ileus und Peritonitis, Mitt. a. d. Grenzgeb. d. Med. u. Chir. *23:* 755, 1911.
7. Mueller, E. F.: Ueber den Paralytischen Ileus, Mitt. a. d. Grenzgeb. d. Med. u. Chir. *41:* 417, 1929.
8. Wangensteen, O. H.: Therapeutic Considerations in Management of Acute Intestinal Obstruction; Technic of Enterostomy and Further Account of Decompression by Employment of Suction Siphonage by Nasal Catheter, Arch. Surg. *26:* 933 (June) 1933.
9. Bartlett, Willard, Jr.: The Concept of Pyloric Balance in Ileus Treated by Continuous Suction from the Stomach, Am. J. Surg. *23:* 484 (March) 1934.
10. Ochsner, Alton: Acute Intestinal Obstruction, South M. J. *24:* 93 (Feb.) 1931.
11. Ochsner, Alton: Acute Ileus, J. M. A. Alabama *2:* 104 (Sept.) 1932.
12. Coller, F. A., and Maddock, W. G.: Dehydration Attendant on Surgical Operations, J. A. M. A. *99:* 875 (Sept. 10) 1932.
13. Van Zwalenburg, C. W.: Strangulation Resulting from Distention of Hollow Viscera, Ann. Surg. *46:* 780, 1907.
14. Dragstedt, C. A.; Lang, V. P., and Millet, R. F.: The Relative Effects of Distention of Different Portions of the Intestine, Arch. Surg. *18:* 2257 (June) 1929.
15. Morton, J. J.: Treatment of Ileus, Ann. Surg. *96:* 856 (June) 1932.

# THE RELIEF OF PELVIC PAIN

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NO advance in the application of our knowledge of visceral neurology is of greater importance than the work of the past few years directed toward relief of pelvic pain by ablation of the superior hypogastric plexus, commonly known as the presacral plexus.

The work done in various types of pelvic pain illustrates clearly the newer conceptions of surgical therapy which are based on the application of physiology and neurology to clinical medicine rather than placing primary emphasis on the pathologic end result of disease.

Surgery of the sympathetic and visceral nerves is attaining more and more prominence, and is rapidly becoming a potent factor in therapy. Lord Moynihan[1] aptly remarked in 1930, "The surgery of the future will be that which is based upon the correction or alteration of abnormal physiology rather than upon the removal of diseased tissue."

## Historical

Jaboulay[2] in 1898 was the first to attempt the relief of pelvic pain by interruption of the pelvic visceral nerves. His results were not conclusive, probably because of the limited knowledge of the anatomy and physiology of his day. Soon after, Ruggi[3] advised resection of the utero-ovarian plexus and reported cases in which pelvic pain was relieved by this procedure.

In spite of the fact that a number of continental surgeons worked along these lines, their conclusions were not accepted generally at that time, and there was a dearth of literature on the subject during the early part of the twentieth century. LeRiche's work early in the century was directed toward the relief of painful conditions in the pelvis by application of his periarterial sympathectomy. This work was fundamental even though at the time its application was not based on sound physiologic or anatomic facts. Nevertheless, his work served to stimulate others to conduct investigations.

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It was not until 1925 that satisfactory reports were made by Cotte[4] who stated that resection of the presacral nerve (better designated as the superior hypogastric plexus according to Fontaine and Herrmann) gave relief of pain in cases of functional dysmenorrhea.

American surgeons have been hesitant in accepting these reports. Herrmann[5] was the first in America to resect the superior hypogastric plexus for the relief of pelvic pain. This was done in 1928, but the complete report did not appear until February, 1932. At that time he reported twenty-two cases of dysmenorrhea and pelvic pain relieved by resection of the superior hypogastric plexus. In the past two years strikingly successful results have been reported by Wetherell,[6] DeCourci,[7] Adson,[8] Craig and Counseller,[9] Flothow,[10] and others.

In view of these reports it is evident that the relief of pelvic pain in cases which have not been successfully treated by the usual methods can be accomplished in many instances by interrupting the afferent fibers passing through the superior hypogastric plexus.

Let us hope that here we will not see the errors of overenthusiasm exhibited in other fields of surgery of the sympathetic nervous system. To this end it becomes necessary that we ascertain diagnostic criteria for the selection of cases, and it is here that we have added something of value, namely, the use of diagnostic injections of the superior hypogastric plexus.

## Anatomy

Although all of the pathways by which pain from the pelvic organs may reach conscious centers are not absolutely defined as yet, it is evident that the great majority of afferent sensory fibers from the pelvic viscera course through the superior hypogastric plexus in their ascent to the spinal cord, and thence to conscious centers.

It is possible that some afferent fibers may reach the lumbar sympathetic chain directly by way of blood vessels, and possibly by direct fibers to the lumbosacral chain, without traversing this plexus. Clinical results, however, warrant the statement that these fibers are probably few and of little importance.

As yet no evidence has been adduced to indicate that the sacral parasympathetic fibers carry any painful sensations.

This allows our attention to be directed entirely to the superior hypogastric plexus.

Coursing downward on the aorta from the level of the superior mesenteric artery, and from the celiac and greater splanchnic ganglia, is a network of nerve fibers arranged more or less in two parallel bundles. These have been designated as the intermesenteric nerves since they course downward between the origins of the superior and inferior mesenteric arteries. At the level of the inferior mesenteric artery there is a division of these nerves, and a portion follow the artery to be distributed to the lower colon and rectum. The remainder of the nerves pass over the iliac vessels and the promontory of the pelvis. At the level of the bifurcation of the aorta they are grouped in a plexus of nerves which is designated as the superior hypogastric plexus. This plexus extends downward for a distance of 1½ to 2 inches from the bifurcation of the aorta, occupying a position mainly on the body of the fifth lumbar vertebra and a portion of the sacrum in a space known as the interiliac trigone. The disposition of these nerves has been shown in numerous dissections. There is a definite tendency to form a single nerve trunk rather than a nerve plexus, and for this reason it has been called the presacral nerve.

According to Elaut[11] there are four main types of plexi. In about one half of the cases the nerves are typically in the form of a plexus; in one fourth they tend to form a distinct nerve; in one fourth there is a tendency toward parallel fibers with two connecting trunks, and in 2 per cent there is an arch-shaped plexus.

From the surgical standpoint it is important that we understand the relation of this anatomy to the various structures. The area in which the plexus lies is known as the interiliac trigone. This area should be accurately visualized since the tissue which is excised is that which lies between the bifurcation of the aorta and upper portion of the sacrum, bounded laterally by the common iliac vessels.

It is perhaps well to mention a further source of possible visceral afferent fibers which must be taken into consideration. There are fibers entering the lumbosacral trunks which do not course through the superior hypogastric plexus, and there is the possibility that some of these fibers may be visceral affer-

ents. It is apparent clinically that these fibers are probably entirely efferent in function.

When we consider the nerve supply of the separate pelvic organs, the fact that the ovaries have an independent innervation is immediately noted. The fibers supplying the ovaries originate from the superior mesenteric and renal plexi; coursing with the ovarian arteries to reach their destination via the hilus and suspensory ligament.

The sympathetic innervation of the uterus, bladder and rectum is almost entirely by way of the superior hypogastric plexus. From there it is carried to the inferior hypogastric nerves which enter further plexi at the bases of the various organs.

No further definition of nerve supply to these various organs is necessary. They all course through the same "bottle neck" of the superior hypogastric plexus. It would be impossible to differentiate which fibers are those going to and from the separate organs.

## Physiology

While the present status of knowledge of the neurophysiology of the sympathetics and parasympathetics, and their relation to function of the pelvic organs is somewhat inadequate, nevertheless, certain physiologic facts are established. These form the basis from which our surgical procedures are predicated in the relief of pelvic pain.

It is known that the sympathetics supply vasomotor fibers to the blood vessels of the pelvic organs, and that they play a part in the control of the smooth muscle of these organs. Even though all sympathetic connections of the uterus have been severed, the uterine muscle function is not lost making it apparent that the sympathetic nerves merely modify the action of the muscle. Perhaps it is true that the musculature of the uterus is dependent upon parasympathetic innervation just as it is in the bladder.

The bladder and the rectum can be considered together as the physiology in regard to the visceral innervation is parallel. In both organs the sympathetic fibers supply contractile elements to the internal sphincter, and they further have inhibiting action on the detrussor, or emptying, mechanism of both organs. This physiologic fact is applied in the relief of bladder

spasm, cord bladder, and also in certain forms of constipation. Interruption of the sympathetic pathways results in a release of internal sphincter spasm and unopposed detrussor action.

In this discussion we are interested mainly in the visceral afferent fibers that carry painful sensations. Even though these fibers may not be truly sympathetic, they course along with the true sympathetics and cannot be differentiated from them grossly.

The important point from the standpoint of physiology is the fact that the parasympathetic distribution to these organs plays no part in the transmission of painful stimuli. Furthermore, it is apparent clinically that at least the great majority of painful sensations find their way to consciousness from the pelvic organs by way of the superior hypogastric plexus. It is this physiologic and anatomic knowledge which warrants the surgeon's interrupting these pathways for the relief of pelvic pain.

Sweet and Thorpe[12] have demonstrated in a series of albino rats that sympathectomy does not effect estruation nor does it interfere with pregnancy or labor. I have not had occasion to observe the effect on pregnancy after resection of the superior hypogastric plexus, but it would seem that labor in the first stage should be comparatively painless.

## Selection of Cases

Herrmann groups the cases in which surgery is indicated into three classes: (1) cases in which no organic lesion of the genital organs can be found to account for the pain, i. e., functional dysmenorrhea; (2) cases of pelvic pain in which some slight lesion is present which obviously does not respond to ordinary gynecologic procedure, since pain persists after correction of the pelvic pathology; (3) cases of inoperable malignancies of the pelvis.

To these we have added a fourth group, namely, those cases, frequently associated with pelvic pain, where there is painful bladder spasm or vague complaints referable to vagina or perineum. This type is not common, but forms a very unhappy group. These patients often complain of severe burning sensations in the vagina with frequency, dysuria and colpospasm, and vaginal and cystoscopic examinations may show no abnormality, or, if abnormality is present, correction may not relieve the complaint.

In view of a recent report by White and Treahy[13] perhaps a fifth group should be included, namely, those cases with painful bladder due to ulceration.

In reviewing these various indications, one point should be emphasized concerning group 2, those cases with pelvic pathology. If the surgeon has some doubt as to whether or not the lesion is sufficient to cause the symptoms, he should remove the superior hypogastric plexus at the same time he is doing the corrective surgery. We feel the time will come when in this type of case many gynecologists will remove the plexus routinely as an added insurance of a successful outcome.

I have had no experience with the third group (malignancies of the pelvis) as the condition is usually beyond the point where a simple operation of this type would relieve pain, although Wetherell[6] reports excellent results in his cases.

It is in the questionable cases that further diagnostic criteria are necessary. We feel that we have developed these criteria in the use of the diagnostic injection of the superior hypogastric plexus and the second and third lumbar sympathetic ganglia.

In view of all that has been written in recent years on diagnostic injection of the sympathetic nerves, it is surprising that so little has been said about diagnostic injections in cases of pelvic pain. I have been unable to find in the literature any other references to injection methods.

It is apparent that many surgeons are approaching the subject of relief of pelvic pain by a way of surgical removal of the superior hypogastric plexus in a very cursory manner. It is this method of approach used so frequently in the realm of sympathetic surgery which has dimmed several chapters in its history, and in order to avoid a similar result in the case of pelvic pain, I feel that it is a matter of primary importance that he who would do this type of surgery equip himself with diagnostic methods by means of which he can properly select his cases.

The injection of the second and third lumbar ganglia is exactly the same as that I have previously described.[14] To this I have added a variation in my technic similar to Labat's[15] for splanchnic anesthesia, but inserting the needle at the level of the fourth lumbar interspace 7 cm. from the midline at an angle of 45 degrees until the upper portion of the body of the fifth lumbar vertebra is encountered, then advancing the

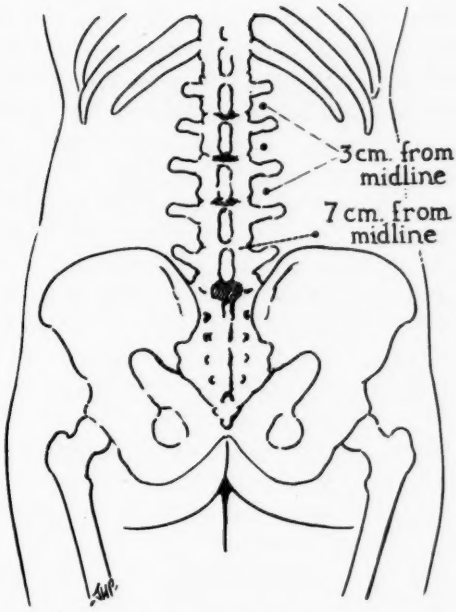


FIG. 1. Diagram showing point of insertion of needles for lumbar diagnostic injection of the superior hypogastric plexus. The lower point 7 cm. from the midline is the point of injection for the plexus, the same point being used on the other side.

needle over the anterolateral surface of the body of the vertebra for a distance of about 1.5 cm. If this injection is done bilaterally, and 5 to 10 c.c. of 2 per cent procaine deposited in each needle, it will result in anesthesia of the superior hypogastric plexus.

The application of this diagnostic test is not difficult. It is necessary that the patient be experiencing pain at the time of the injection. If the pain is relieved by this injection, one can be almost certain that surgical removal of the plexus will also result in the relief of pain. We add another procedure: in some cases this diagnostic injection may be followed by a therapeutic alcohol injection. This has its disadvantage which will be discussed later.

It is interesting that occasionally the injection of procaine for diagnostic purposes has resulted in permanent relief of pain. This occasional result occurs in pain of any type that is related to the sympathetic nervous system, and for this reason we do not advocate either operation or alcohol injection

immediately following the diagnostic test. As an example I recite the case reported several years ago:[10] A patient with severe bladder spasm and pelvic pain which was permanently relieved by the injection of novocaine at the lumbar sympathetics.

A more recent case is that of a young woman 26 years of age who had a pelvic operation one year ago for the relief of severe pelvic pain. Following salpingectomy the patient still complained of the same pain. I was asked to see her preliminary to another pelvic operation, the surgeon having in mind a superior hypogastric plexus neurectomy. He agreed that it would be wise to do a diagnostic injection to determine whether or not the pain would be relieved. The patient was promptly relieved of pain, and at the present time several months have elapsed and there has been no recurrence. Had the pain relief been for the duration of the anesthesia the surgeon could have removed the superior hypogastric plexus confident of success.

Why a simple procaine injection of the sympathetic ganglia should result in permanent relief of pain is difficult to explain. Probably it is due to breaking of a pain reflex which for some reason does not return. Perhaps the result is due to some chemical change caused by the procaine.

I have seen several cases in which clinically the type of pain should have responded to removal of the plexus. Closer study of these patients plus diagnostic injection has revealed that this pain was psychogenic in origin and could not be relieved by any type of pelvic operation. In one case, not satisfied that my failure to relieve pain by injection was absolutely diagnostic, I checked with a spinal anesthetic reaching the nipple line and found that the patient still complained of severe pelvic pain at the height of anesthesia.

It is my custom in cases that are not relieved by injection, or where there is some doubt, to check in this manner. If pain is not relieved, certainly no surgical procedure can possibly be effective.

A fairly large percentage of women having these peculiar types of pain fall into this classification; that is, pain of psychogenic origin. Unless we accurately determine which cases are suitable for surgery we undoubtedly will have a comparatively large number of failures following operation.

## Therapeutic Injections

Unquestionably surgical removal of the superior hypogastric plexus has many advantages over any injection method. There are some cases, however, in which alcohol injection can be successfully used in lieu of surgery. One of the real indications for alcohol injection is the doubtful borderline case where it may be used as a glorified diagnostic procedure to be followed by surgery if it is successful in relieving pain.

I was apparently the first to use alcohol injection of the superior hypogastric plexus. Undoubtedly the procedure will never become widely applied because of antipathy to injecting alcohol. It does have a valuable place in therapy, however, as for example in the following case:

Mrs. L. P., age 23, complained chiefly of dysmenorrhea. Commencing either just before or after the beginning of each period, the patient would suffer excruciating cramps for from four to six hours. These pains were so severe that hypodermic injection of one-half grain of morphine gave incomplete relief. For this condition she had had two pelvic operations, neither of which gave relief.

This patient was seen first at the end of her period of dysmenorrhea. She stated that for twenty-four hours after the onset of her menses she would be exquisitely tender in both iliac regions. We did a bilateral injection of the second, third and fourth lumbar sympathetic ganglia, injecting 5 c. c. of procaine through each needle, feeling that perhaps we might gain a clue as to whether or not injection would be of any avail. Within ten minutes the tenderness and pain in the iliac region had entirely disappeared.

At her next period I was able to inject her within the first hour. She had prompt relief of pain, and on this basis the diagnostic injection was followed by alcohol injection of 5 c. c. of alcohol through each needle. She had a modified amount of pain at the following period but it was not so severe and did not last so long. Since then she has had no further trouble, and a period of three years has elapsed.

This case is typical of what may be accomplished in cases of functional dysmenorrhea. It is not unusual for them to be relieved of pain at the time of injection, and then to have a period or two follow with modified pain, and after this be completely relieved.

There have been cases in which relief of pain has followed simple diagnostic injection, but subsequent alcohol injection has been unsuccessful. In view of the result of the diagnostic injection in these cases we advise surgical removal as it is probable that the failure of alcohol to relieve the pain is due to incomplete injection of pain fibers.

This brings up some of the disadvantages of alcohol, namely, its lack of permanence and the fact that it is a blind procedure. Failures may, of course, be due to incomplete denervation of pain-carrying fibers. A further disadvantage of alcohol injection is that it is followed frequently by a severe neuritis due to some of the alcohol reaching somatic

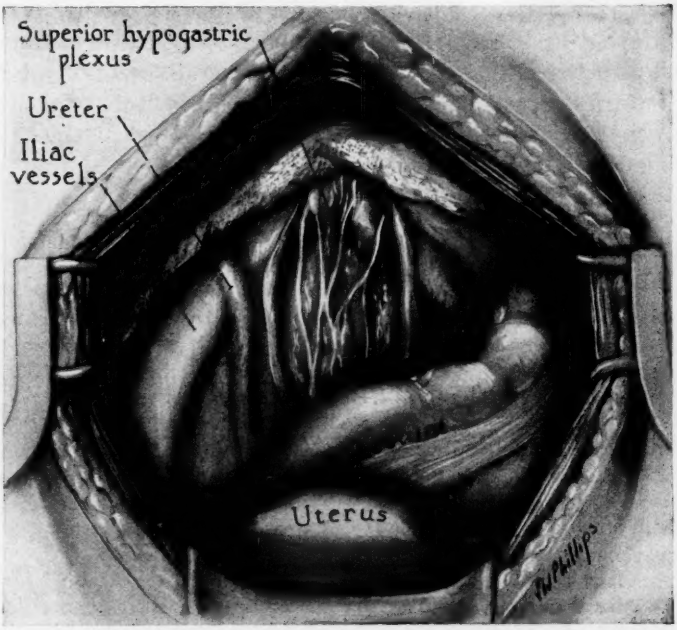


FIG. 2. Operative drawing showing the intestines retracted upward, the peritoneum opened in the midline exposing the superior hypogastric plexus preliminary to its removal.

fibers. In one or two cases there has been a transient weakness of the quadriceps group of muscles.

I feel that the proper place for alcohol injection is in cases of functional dysmenorrhea or other types of pelvic pain where no responsible lesion can be found. When a lesion is present I believe that surgery is preferable since the surgeon can correct the existing abnormality and simultaneously remove the superior hypogastric plexus.

## SURGERY OF THE SUPERIOR HYPOGASTRIC PLEXUS

The technic of superior hypogastric plexus neurectomy is not complicated. It is necessary to keep clearly in mind the

anatomy of the iliac trigone. The neurosurgeon dissects the plexus and severs the individual nerves. The general or gynecologic surgeon, however, will probably find it a time-saving measure merely to dissect all of the retroperitoneal tissue in the iliac trigone for a distance of about two inches from the bifurcation of the aorta. The ureters, of course, must be avoided. The only other structure that is of any importance is the middle sacral artery which may be tied. If all of the areolar tissue in the trigone is removed down to the vertebra, the surgeon may be quite certain that he has removed all of the necessary fibers.

The operation is best done in the Trendelenberg position and spinal anesthesia is advantageous.

## SUMMARY

To summarize let us review the various types of cases and give my opinions as to the modus operandi. Type 1: That in which no organic lesion can be found to account for the pain (functional dysmenorrhea). In this type of case I feel that diagnostic injection is of greatest importance. If it relieves the pain, it may be followed by alcohol injection or surgical removal, injection being preferable. Type 2: That in which pelvic abnormality has been corrected but pain persists. Here also I feel that diagnostic injection is necessary, and if successful may be followed by alcohol injection or surgery. If a lesion is present, surgery is advisable. Type 3: In malignancies of the pelvis I feel that by all means alcohol is the procedure of choice. Type 4: That in which pelvic pain is associated with bladder spasm or painful rectal conditions. Either alcohol injection or surgery may be used, depending upon the circumstances. Type 5: Bladder ulcerations might well be treated by alcohol injection.

The important point I wish to emphasize is the fact that certainly any operative procedure directed toward the superior hypogastric plexus must be preceded by a diagnostic injection. It must be successful in relieving the pain or the surgeon faces a grave responsibility in advising operation, and must inform the patient that the result is problematic.

## CONCLUSIONS

A majority of cases of pelvic pain which do not respond to ordinary gynecologic treatment may be relieved by inter-

ruption of the afferent pain fibers coursing through the superior hypogastric plexus.

This interruption of afferent fibers may be accomplished by surgical removal or by alcohol injection of the plexus.

Cases of functional dysmenorrhea having no associated pelvic disease are particularly adaptable to treatment by alcohol injection.

Diagnostic injection of the pelvic sympathetic nerves should always precede any surgical procedure directed toward the relief of pain by denervation of the superior hypogastric plexus.

If properly selected by means of diagnostic injections, and those in which the pain is of psychogenic origin are excluded, practically all cases of pelvic pain can be relieved by one of the two methods suggested, namely, surgical removal or alcohol injection of the superior hypogastric plexus.

REFERENCES

1. Lord Moynihan: Address at British Surgical Congress, Winnipeg, July, 1930; also, Surgery in the Immediate Future, Brit. M. J. *2:* 618 (Oct. 11) 1930.
2. Jaboulay, M.: Le traitement de la nevralgie pelvienne par la paralysie du sympathique sacre, Lyon Med. *90:* 102, 1899.
3. Ruggi, G.: La simpatectomia abdominale utero-ovarica come mezzo di cura di alcune lesioni interne negli organi genitali de la donna. Bologna: Zanichelli, 1899.
4. Cott, G.: La sympathectomie hypogastrique a-t-elle sa place dans la therapeutique gynecologique? Presse Med. *30:* 98, 1925.
5. Fontaine, R., and Hermann, L. G.: Clinical and Experimental Basis for Surgery of the Pelvic Sympathetic Nerves in Gynecology, Surg., Gynec. & Obst., *54:* 133 (Feb.) 1932.
6. Wetherell, F. S.: Relief of Pelvic Pain by Sympathetic Neurectomy, J. A. M. A. *101:* 1295 (Oct. 21) 1933.
7. De Courcy, J. L.: Resection of the Presacral Nerve for Dysmenorrhea, Am. J. Surg. *23:* 408 (March) 1934.
8. Adson, A. W., and Masson, J. C.: Dysmenorrhea Relieved by Resection of Presacral Sympathetic Nerves, J. A. M. A. *102:* 986 (March 31) 1934.
9. Counseller, V. S., and Craig, W. M.: The Treatment of Dysmenorrhea by Resection of the Presacral Sympathetic Nerves, Am. J. Obst. & Gynec. *28: 2:* 161 (Aug.) 1934.
10. Flothow, P. G.: Relief of Pain on a Sympathetic Basis, Northwest Med. *32:* 369 (Sept.) 1933.
11. Elaut, L.: The Surgical Anatomy of the So-called Presacral Nerve, Surg. Gynec. & Obst. *55:* 581 (Nov.) 1932
12. Sweet, L. K., and Thorp, E. G.: Effect of Lower Abdominal Sympathectomy on the Oestrous Cycle, Am. J. Physiol. *89:* 50 (June) 1929.
13. Whyte, D., and Treahy, P. A.: Resection of the Presacral Nerve for Painful Bladder, Australian & New Zealand J. Surg. *3:* 75 (July) 1933.
14. Flothow, P. G.: Diagnostic and Therapeutic Injections of the Sympathetic Nerves, Am. J. Surg. *14:* 591 (Dec.) 1931.

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## BRANHAM

FORTY-FIVE years ago there was excitement in the City Jail of Brunswick. A youthful desperado had secured a 38 and had run amok. He killed one guard and wounded another. On attempting to get the third his pistol was deflected and the bullet entered his own left thigh at about the apex of Scarpa's triangle. The prison authorities with rare forbearance decided not to let him bleed to death, and called in a doctor. The most available one had come to town six months before and his only claim to fame was that shortly before that he had been graduated at the head of a class of 85 at the College of Physicians and Surgeons of Baltimore. The shooting occurred in March.

"Being a young man and an almost unknown doctor, I had an abundance of time at my disposal so I saw my patient very often. Some days after the injury I noticed a small tumor at the site of the wound which I diagnosed as aneurysm of the femoral." Expansile pulsation, thrill, bruit and everything were present. "On trying compression of the femoral in the groin I noticed a peculiar phenomenon,—a decided bradycardia, which puzzled me very much. Compression of the uninjured vessel produced no such symptom. Accompanying the slowing of the pulse from 72 to 45 or 40, there

was a feeling of dizziness and dyspnea." This was before the days of the sphygmomanometer and the x-ray. He had never seen or heard of anything like this phenomenon in Baltimore.

"Bond was made for the young man and as soon as he was able to travel he was taken to his home in Cuthbert, Ga.

"It was decided to operate for aneurysm by ligating the femoral above and below the tumor and removing the clot. His father, a physician, insisted that I do the work and said he would wire me when arrangements for the operation had been perfected.

"Some time in June a telegram was received saying everything was ready for the operation the next morning and that he would have a nephew meet me at the train and conduct me to his home where the work was to be done. My train left Brunswick late in the afternoon arriving in Cuthbert early next morning (no Pullman!)."

As luck would have it, it had been raining hard and he had been unusually busy. "Going to my room to prepare for the trip I discovered to my consternation that the only decent suit of clothes I possessed was gone: I haven't seen it or the negro servant from that day to this. It was too late to get another, even if I had had the wherewithal, which was by no means the case. So I was compelled to wear a very shabby seersucker suit. The trousers had shrunk half way to the knees, and the lapel curled upward and inward. Most of the night was spent in reversing that curl in hopes of the garment presenting a more respectable appearance, but the strenuous efforts were in vain—the curl persisted—it was in fact a 'permanent wave.'

"Reaching my destination very early the next morning I left the train and looked for the nephew who was to meet me. A well-dressed, distinguished-looking man of middle age got off the train just before me, and a young man quickly accosted him asking if he were the doctor. The nephew then turned his eyes towards me, the only other arrival, and after a close inspection seemed disappointed and remarked, 'Well, I reckon he didn't come.' "

Our beardless, bedraggled, 28-year-old hero, who "did not look like a surgeon and felt very much less like one," finally succeeded in establishing his identity, experiencing "no hard

feelings whatever against the nephew." He was taken to "the home of the patient where four assistants were awaiting my arrival. The principal consultant objected to the operation, but the father agreed with me in its favor. A table was improvised, instruments boiled and the operation begun, the opposing consultant giving the ether.

"Dissecting down to the lesion, a pulsating tumor was exposed; a ligature was passed around the artery above and the pulsating vessel below. Before tying, closer inspection revealed that the distal ligature was around the vein. I saw then that we were dealing not with an aneurysm of the femoral artery, but with what I then called an aneurysmal varix or arteriovenous aneurysm. I was simply paralyzed. I asked the consultants for advice as to what to do next,—but silence—only this and nothing more. So I removed the ligature from the vein and placed it around the artery below. This was very small as the full current of blood from the femoral artery was being pumped into the vein. The ligature was tied, the wound closed and drained with strands of horsehair. The ligatures were silk—no catgut was to be had—and they were cut short. I was glad to take the next train home.

"The wound healed up nicely, and in a short time the patient was able to be up and about. I saw him the following January, at which time he was well. I did not ascertain how long the bradycardia persisted after the operation." The young man died of pneumonia in March, about ten months after the original wound, eight months after the operation.

Our young surgeon began to wonder. Perhaps the phenomenon of bradycardia caused by pressure proximal to an arteriovenous aneurysm would be unknown to others too,—at least it should interest them. He had no library to browse in, no Quarterly Cumulative Index Medicus to consult, so he had to content himself with writing out a plain unvarnish'd tale of his observation. In the hope, as he wrote at the time, that it "might elicit some information as to the correct cause of the retarded heart action," he sent it to a medical journal in New York. He received no acknowledgment. In the course of time he began to think that the journal hadn't thought so much of his little paper. Perhaps the sign had been already known to most doctors, or at least to those more learned than he. Oh well, if it hadn't been published, at

least no harm had been done. What with looking at tongues, his yearly quota of typhoid and malaria and all the babies coming into Glynn County, and the ever constant necessity of trying to look wise, he had no time to worry about the fate of his opus.

A quarter of a century passed.

One day a package of books arrived. He hadn't ordered any books, but he thought he might as well give them the once over anyway. He found they were inscribed to Dr. H. M. Branham from Rudolph Matas. His paper had been

Dr. Matas, Mrs. Branham and Dr. Branham.

published some time after he had sent it in. It had been read by Dr. Matas who had corroborated his observation and to the phenomenon of slowing the pulse by pressure proximal to an arteriovenous aneurysm he had given the name "Branham's sign."

This true story's moral to young surgeons who read this journal and who are on their toes is, obviously,

*Forsitan haec olim meminisse juvabit.*

REFERENCES

1. Branham, H. M.: Aneurysmal Varix of the Femoral Artery and Vein, etc., Internat. J. Surg. *3:* 250, 1890. Also, personal communications.
2. Matas, Rudolph: On the Systemic or Cardiovascular Effects of Arteriovenous Fistulae: A General Discussion Based upon the Author's Surgical Experience, Tr. South. S. A. *36:* 623-677, 1923. Also, personal communications.
3. York, Jesse L.: Personal communications.

# BOOK REVIEWS

*The Editors of* THE SOUTHERN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.*

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SURGICAL PATHOLOGY OF THE PERITONEUM. By ARTHUR E. HERTZLER, M. D., Surgeon to the Agnes Hertzler Memorial Hospital, Halstead, Kans.; Professor of Surgery, University of Kansas. 304 pages with 201 illustrations. Philadelphia, Montreal and London; J. B. Lippincott Company, 1935.

This is a typical Hertzler book: that is to say, it sparkles with common sense, sincerity and wit; the author's extensive experimental work, his real knowledge of pathology (both of the dead house and hot meat varieties) and, above all, his more than forty years of clinical experience are evidenced throughout. It is also profusely illustrated with photographs, microphotographs and Tom Jones drawings, all of the highest quality.

Dr. Hertzler maintains that normal variations in the embryologic development of the peritoneum are often mistaken for "adhesions," and thus have resulted in needless operations; sometimes on the other hand the operator is satisfied to tamper with such trifling anomalies without exploring the abdomen further, and thus misses the real seat of the mischief. "Postoperative adhesions" he considers beneficent except in the rare instances when they cause actual intestinal obstruction: they do not, he feels sure, ever cause chronic symptoms. He seems to agree absolutely with Alvarez about leaving the abdomen of the average neurotic female severely alone. It is possible (though, in the reviewer's mind, far from probable) that Dr. Hertzler makes too light of "adhesions." Those who feel that adhesions cause most of the ills that flesh is heir to will be stimulated to think by reading this book. The author who can make you think has rendered you a real service.

Though this may seem to be the most highly specialized volume that has appeared since that famous book on diseases of the navel, one must not gather the idea that it is not of real practical value. It was written by one who is primarily a clinician, even if he has applied his excellent brain and much fine thought to experimental medicine and pathology. Its careful study by those who open the peritoneal cavity should save many lives.

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THE CARE OF THE AGED, THE DYING AND THE DEAD. By ALFRED WORCESTER, M. D., Sc. D., Henry K. Oliver Professor of Hygiene, Harvard University. Pp. 77. Price, $1. Springfield and Baltimore: Charles C Thomas, 1935.

These three splendid lectures are presented in graceful form to advance the art of medicine.

The experienced family doctor, particularly if he be of the old school, may learn little from them, but the high-powered, scientifically trained youngster should be required to read, mark, learn and inwardly digest them.

SURGICAL DISEASES OF THE CHEST. By EVARTS AMBROSE GRAHAM, A. B., M. D., F. A. C. S., Professor of Surgery, Washington University School of Medicine, St. Louis; Surgeon-in-Chief, Barnes Hospital, St. Louis, etc.; JACOB JESSE SINGER, M. D., F. A. C. P., Associate Professor of Clinical Medicine, Washington University School of Medicine, etc., and HARRY C. BALLON, M. D., C. M., F. A. C. S., Formerly Assistant Professor of Surgery, Washington University School of Medicine, with special sections by the late Dr. RAY W. MATSON and others. 1,070 pages, with 637 illustrations, Price, $15. Philadelphia: Lea and Febiger, 1935.

Properly this work opens with "Some Physiological Considerations of Importance to the Thoracic Surgeons." This chapter is also of profound importance to all other physicians who encounter patients with diseases of the chest. Indeed every doctor, particularly the internist and the rhinolaryngologist, should at least have access to this book. It is unnecessary to recommend this book to the surgeon who does or who contemplates doing surgery of the chest, because such a surgeon, if he knew of his existence as he must, could not dare continue his work without this book at hand.

Other chapters deal with the technic of anesthesia, postoperative pulmonary complications, diseases of the pleura, the mediastinum, diseases of the heart and pericardium, surgical treatment of lesions of the esophagus, the diaphragm, bronchography, diseases of the trachea and bronchi endoscopically considered, diseases of the bronchi, bronchiectasis, diseases of the lung, diseases of the lung caused by fungi, tumors of the lung, and an elaborate section devoted to pulmonary tuberculosis with all of the modern surgical procedures in its treatment.

Probably no man has made more personal contributions of value in this field than the senior author (and the SURGEON is proud once more that it can list him among its advisors), yet the contributions of others are carefully covered both in the text and in the bibliography. The co-authorship of an internist and of a nose and throat specialist indicates its well roundedness. May one say that stereoscopic vision is provided through the diverse viewpoints?

Numerous case reports serve to bring out special points and to enhance interest. The many roentgenograms are well chosen and most informative. Photographs and drawings complete the unusually fine illustrations. It is to be hoped, however, that they will not make resection of a lung for cancer appear such a simple operation that every owner of a scalpel will be tempted to try it.

Every thoracic surgeon must share with the reviewer physical possession of the book and his joy and enthusiasm over possessing it. It should also be owned by the general surgeon that he may more adequately and safely perform such operations on the chest as tradition allows him (and in the smaller centers these constitute no inconsiderable number) and more wisely treat those complications that occur in spite of his precautions. The internist too owes it to his patients with diseases of the chest to know what modern surgery offers them.

The achievement of this book is monumental.

A TRUTHTELLING MANUAL AND THE ART OF WORLDLY WISDOM, being a Collection of the Aphorisms which appear in the Works of Padre BALTASAR GRACIAN, immediately translated for the understanding from a 1653 Spanish text by MARTIN FISCHER, M. D. Pp. 305. Price, $3. Springfield and Baltimore: Charles C Thomas, 1934.

Some three centuries ago when Cervantes was putting the quietus on feudal chivalry and every returning galleon was bringing new treasure and new tales to Spain, Baltasar Gracian was born. Every intelligent Spaniard must have gotten a tremendous wallop out of living in those days, and few were as intelligent as Gracian.

The cream of his writings collected to form this Manual has been translated and retranslated many times. Dr. Fischer has gone to the original to provide us with the present fresh version, and Mr. Thomas has made of it a gem. Its wisdom, sophistication and wit make it gorgeous reading today. The little volume makes a swell gift for almost any adult.

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ECONOMIC PROBLEMS OF MEDICINE. By A. C. CHRISTIE, M. S., M. D., Professor of Clinical Radiology, Georgetown University Medical School; President, Fifth International Congress of Radiology; Formerly President of the Medical Society of the District of Columbia, the American Roentgen Ray Society, The American College of Radiology and Member of the Committee of the Costs of Medical Care. 242 pages. Price, $2. New York: The MacMillan Company, 1935.

During the Nashville meeting last year the Advisory Editorial Board ordered that the editorial pages of the SURGEON leave medical economics severely alone: that the pages of *The Journal of the American Medical Association* and of the state medical journals were quite competent to handle it. However, the Editor must recommend this book to every doctor who is not behaving like an ostrich.

The author after years of service on the Committee on the Costs of Medical Care was singularly well fitted to write this book: he presents the problems without verbosity. Changes in the practice of medicine have come about in recent years. More serious ones are apt to develop. Forewarned is forearmed. He takes up various plans that have been proposed and points out their defects and virtues.

The last chapter summarizes the essential elements in a comprehensive plan for medical care. It should be carefully studied by each one of us. A paragraph must be quoted:

"The medical profession is at the center of the problem of medical care. It must bear the main responsibility for its solution. . . . To object that the profession has not the proper social training or outlook for such responsibility is simply begging the question. If this be true then the profession must receive the necessary training. The results for society will be much better if the leaders in sociology, public health and medical philanthropy will assist the profession to make necessary adjustments in the present system, rather than threatening, as has often been done of late, to force the medical profession into an entirely new system which the profession believes ill-adapted to the ends desired.

THE PRINCIPLES AND PRACTICE OF UROLOGY. By FRANK HINMAN, A. B., M. D. Clinical Professor of Urology at the University of California Medical School. 1,111 pages with 513 illustrations and 48 tables. Price, $10. Philadelphia and London: W. B. Saunders Company, 1935.

This is the first satisfactory text of urology in some eight or ten years that has come to the attention of the reviewer. It was designed to present "the principles of urology in a form that would be of practical use to the medical student and the man in general practice. The book was not written for the urological specialists except for use by them in the medical education of others. In the end, the book covers in detail the principles of foundation and of practice and it is neither a primer nor a compendium. It includes everything necessary for the instruction of the medical student, covers the field completely for the general practitioner, and should prove of interest and value as a reference book to the trained urologist. The limitations of one volume prevent the presentation in detail of surgical technic and methods of urological treatment."

Such was the author's platform. He has carried out his platform conscientiously, thoroughly and capably. Would to heaven that some of our politicians would live up to theirs as well.

The wide variety of excellent illustrations must be noted. Typographically, the volume is worthy of the Saunders Company.

The outline of the fundamentals, including embryology, is full and most satisfying. The section on urogenital tuberculosis is quite modern. The section on gonorrhea is particularly good. The author realizes that most cases of gonorrhea must be treated by the general practitioner and that all too often he does it without enthusiasm, skill or persistence. This treatise appears to contain about all that should be known about the clinical aspects of the disease. Certainly if every one who contracts it should place himself promptly under the care of a man who would treat him according to the regimen of Dr. Hinman, both the incidence and the morbidity of the disease would be immeasurably reduced. Per contra, the author appreciates that syphilis of the central nervous system, and indeed all post-primary syphilis, is not a urologic condition and he devotes space accordingly.

The psychic disturbances pertaining to sexual disorders, organic and functional, are dealt with, if not altogether to the taste of the professional psychiatrist who sees only his side, at least with an able grasp of that side.

As is proper in a textbook designed for wide distribution, Dr. Hinman is conservative in his attitude about trans-urethral resection of the prostate. It may be that he is a bit too conservative.

Rare indeed will be the urologist who cannot profit by this book. It should fulfil satisfactorily the needs of others who encounter patients with diseases of the genito-urinary system.

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*Erratum.*—In the April number of the date of the Seventh Annual Assembly of The Southeastern Surgical Congress, to be held in New Orleans, was given erroneously. The Assembly will be staged at the Hotel Roosevelt on March 8, 9 and 10, 1936.